

This document presents all details related to the second example of the paper. The details of all randomly generated BMI problems along with the results of all methods are given in the following. As explained in the text of the paper, two hundred BMI problems are generated that are divided to twenty batches of ten problems. All problems in each batch has the same number of BMI constraints r and the same BMI dimension n . Each BMI problem can be completely represented via proposing matrices $\{R_i\}_{i=1}^r$ which are separately given in the following. Plus, the computational time and the obtained solution of each method (related to each problem) is given respectively.

From here, 10 BMIs in the batch related to $n=2$ and $r=1$ are presented

BMI problem number 1 in this batch has the following matrices (R_s)

$$R_1 = \begin{bmatrix} -0.0500 & 0.3957 \\ 0.3957 & -0.6433 \end{bmatrix}$$

Benders Method is applied to the BMI problem

The method lasts 2.3054 seconds

The method found a feasible solution given in the following

$$X = \begin{bmatrix} 0.5000 & 0.0000 \\ 0.0000 & 0.5000 \end{bmatrix}$$

$$Y = \begin{bmatrix} -0.6180 & -0.1782 \\ -0.1782 & -0.3507 \end{bmatrix}$$

Path Method is applied to the BMI problem

The method lasts 2.9544 seconds

The method found a feasible solution given in the following

$$X = \begin{bmatrix} 0.9318 & 0.2279 \\ 0.2279 & 0.2382 \end{bmatrix}$$

$$Y = \begin{bmatrix} -0.4319 & -0.4011 \\ -0.6805 & 0.1167 \end{bmatrix}$$

ILMI Method is applied to the BMI problem

The method lasts 0.7913 seconds

The method found a feasible solution given in the following

$$X = \begin{bmatrix} 0.8153 & 0.0098 \\ 0.0098 & 0.9995 \end{bmatrix}$$

$$Y = \begin{bmatrix} -0.8619 & -0.1045 \\ -0.1453 & -0.6377 \end{bmatrix}$$

Proposed Method is applied to the BMI problem

The method lasts 2.2110 seconds

The method found a feasible solution given in the following

$X=[0.2768 \ 0.4472; 0.4472 \ 0.7234]$

$Y=[-0.2770 \ -0.4470; -0.4470 \ -0.7214]$

BMI problem number 2 in this batch has the following matrices (Rs)

$R1=[0.2886 \ -0.7932; -0.7932 \ -0.9112]$

Benders Method is applied to the BMI problem

The method lasts 0.7289 seconds

The method found a feasible solution given in the following

$X=[0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y=[-0.5906 \ 0.2343; 0.2343 \ -0.2362]$

Path Method is applied to the BMI problem

The method lasts 0.7871 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.6691 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 4.0077 seconds

The method found a feasible solution given in the following

$X = [0.9999 \ -0.0099; -0.0099 \ 0.0039]$

$Y = [-0.9949 \ 0.0160; 0.0174 \ 0.0006]$

BMI problem number 3 in this batch has the following matrices (Rs)

$R1 = [-1.1913 \ -0.2012; -0.2012 \ -0.0016]$

Benders Method is applied to the BMI problem

The method lasts 0.7551 seconds

The method found a feasible solution given in the following

$X = [0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y = [-0.2098 \ 0.0818; 0.0818 \ -0.6936]$

Path Method is applied to the BMI problem

The method lasts 1.0264 seconds

The method found a feasible solution given in the following

$X = [0.3014 \ 0.0297; 0.0297 \ 0.9987]$

$Y = [0.3574 \ -0.6401; 0.0915 \ -0.3052]$

ILMI Method is applied to the BMI problem

The method lasts 0.6272 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 3.9546 seconds

The method found a feasible solution given in the following

$X = [0.9055 \ -0.2919; -0.2919 \ 0.0983]$

$Y = [-0.8440 \ 0.2932; 0.2962 \ -0.1022]$

BMI problem number 4 in this batch has the following matrices (Rs)

$R1 = [-0.3445 \ -0.1977; -0.1977 \ -0.0977]$

Benders Method is applied to the BMI problem

The method lasts 0.7603 seconds

The method found a feasible solution given in the following

$X = [0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y = [-0.5185 \ 0.1046; 0.1046 \ -0.6491]$

Path Method is applied to the BMI problem

The method lasts 1.7262 seconds

The method found a feasible solution given in the following

$X = [0.7368 \ -0.4334; -0.4334 \ 0.2863]$

$Y = [-0.4360 \ 0.2803; -0.4579 \ 0.1231]$

ILMI Method is applied to the BMI problem

The method lasts 0.6170 seconds

The method found a feasible solution given in the following

$X = [0.2238 \ -0.0003; -0.0003 \ 1.0000]$

$Y = [-0.4414 \ 0.0205; 0.1473 \ -0.4570]$

Proposed Method is applied to the BMI problem

The method lasts 2.0224 seconds

The method found a feasible solution given in the following

$X = [0.9399 \ 0.2376; 0.2376 \ 0.0601]$

$Y = [-0.9361 \ -0.2362; -0.2361 \ -0.0596]$

BMI problem number 5 in this batch has the following matrices (Rs)

$R1 = [-0.0297 \ 0.1668; 0.1668 \ -0.2620]$

Benders Method is applied to the BMI problem

The method lasts 0.7363 seconds

The method found a feasible solution given in the following

$X = [0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y = [-0.6604 \ -0.0895; -0.0895 \ -0.5357]$

Path Method is applied to the BMI problem

The method lasts 0.9696 seconds

The method found a feasible solution given in the following

$X=[0.9405 \ 0.1048; 0.1048 \ 0.8156]$

$Y=[-0.7643 \ -0.1039; 0.3456 \ -0.7061]$

ILMI Method is applied to the BMI problem

The method lasts 0.6393 seconds

The method found a feasible solution given in the following

$X=[0.3356 \ 0.4107; 0.4107 \ 0.7461]$

$Y=[-0.3308 \ -0.0013; -0.2008 \ -0.3263]$

Proposed Method is applied to the BMI problem

The method lasts 2.2544 seconds

The method found a feasible solution given in the following

$X=[0.2695 \ 0.4435; 0.4435 \ 0.7308]$

$Y=[-0.2685 \ -0.4400; -0.4392 \ -0.7196]$

BMI problem number 6 in this batch has the following matrices (Rs)

$R1=[0.5023 \ -0.2229; -0.2229 \ -0.9364]$

Benders Method is applied to the BMI problem

The method lasts 0.7484 seconds

The method found a feasible solution given in the following

$X=[0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y=[-0.6947 \ 0.0818; 0.0818 \ -0.1666]$

Path Method is applied to the BMI problem

The method lasts 1.0037 seconds

The method found a feasible solution given in the following

$X=[0.9848 \ 0.0504; 0.0504 \ 0.8332]$

$Y=[-0.6178 \ -0.3922; -0.4864 \ -0.4583]$

ILMI Method is applied to the BMI problem

The method lasts 0.6238 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 4.3464 seconds

The method found a feasible solution given in the following

$X=[0.7898 \ -0.4066; -0.4066 \ 0.2137]$

$Y=[-0.7890 \ 0.4006; 0.3995 \ -0.2022]$

BMI problem number 7 in this batch has the following matrices (Rs)

$R1=[-0.2158 \ 0.1003; 0.1003 \ 0.4443]$

Benders Method is applied to the BMI problem

The method lasts 0.7528 seconds

The method found a feasible solution given in the following

$X=[0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y=[-0.3715 \ -0.0499; -0.0499 \ -0.6997]$

Path Method is applied to the BMI problem

The method lasts 1.0741 seconds

The method found a feasible solution given in the following

$X=[0.9174 \ 0.0176; 0.0176 \ 0.9962]$

$Y=[-0.7660 \ -0.0123; -0.0377 \ -0.9967]$

ILMI Method is applied to the BMI problem

The method lasts 0.6225 seconds

The method found a feasible solution given in the following

$X=[0.2226 \ 0.0148; 0.0148 \ 0.9997]$

$Y=[-0.4641 \ 0.0180; -0.0805 \ -0.5653]$

Proposed Method is applied to the BMI problem

The method lasts 2.1806 seconds

The method found a feasible solution given in the following

$X=[0.0030 \ 0.0516; 0.0516 \ 0.9973]$

$Y=[-0.0032 \ -0.0594; -0.0547 \ -0.9355]$

BMI problem number 8 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} 0.4159 & 0.3957 \\ 0.3957 & 0.1994 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 1.8030 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.7222 & 0.1696 \\ 0.1696 & 0.6294 \end{bmatrix}$

$Y = \begin{bmatrix} -0.8324 & -0.0956 \\ -0.0956 & -0.7801 \end{bmatrix}$

Path Method is applied to the BMI problem

The method lasts 3.0446 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.6822 & 0.3216 \\ 0.3216 & 0.6746 \end{bmatrix}$

$Y = \begin{bmatrix} -0.6226 & 0.0508 \\ 0.0330 & -0.4578 \end{bmatrix}$

ILMI Method is applied to the BMI problem

The method lasts 0.6570 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 7.9319 seconds

The method found a feasible solution given in the following

$X=[0.5643 \ 0.4958; 0.4958 \ 0.4357]$

$Y=[-0.5642 \ -0.4957; -0.4957 \ -0.4355]$

BMI problem number 9 in this batch has the following matrices (Rs)

$R1=[0.0678 \ 0.4865; 0.4865 \ -0.3349]$

Benders Method is applied to the BMI problem

The method lasts 0.7432 seconds

The method found a feasible solution given in the following

$X=[0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y=[-0.5640 \ -0.2140; -0.2140 \ -0.3869]$

Path Method is applied to the BMI problem

The method lasts 1.8296 seconds

The method found a feasible solution given in the following

$X=[0.5055 \ 0.4907; 0.4907 \ 0.5130]$

$Y=[-0.0430 \ -0.0935; -0.2427 \ -0.4076]$

ILMI Method is applied to the BMI problem

The method lasts 0.6309 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 2.2506 seconds

The method found a feasible solution given in the following

$X = [0.2212 \ 0.4148; 0.4148 \ 0.7790]$

$Y = [-0.2214 \ -0.4148; -0.4148 \ -0.7771]$

BMI problem number 10 in this batch has the following matrices (Rs)

$R1 = [-0.0510 \ -0.3034; -0.3034 \ 0.3910]$

Benders Method is applied to the BMI problem

The method lasts 0.7484 seconds

The method found a feasible solution given in the following

$X = [0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y = [-0.4159 \ 0.1481; 0.1481 \ -0.6317]$

Path Method is applied to the BMI problem

The method lasts 2.3241 seconds

The method found a feasible solution given in the following

$X = [0.4073 \ -0.2062; -0.2062 \ 0.9283]$

$Y = [-0.2050 \ 0.4591; 0.0283 \ -0.2323]$

ILMI Method is applied to the BMI problem

The method lasts 0.6695 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 10.4288 seconds

The method found a feasible solution given in the following

$X = [0.0536 \ -0.2250; -0.2250 \ 0.9465]$

$Y = [-0.0537 \ 0.2251; 0.2250 \ -0.9434]$

From here, 10 BMIs in the batch related to $n=2$ and $r=2$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

$R1 = [-0.5525 \ -0.0973; -0.0973 \ 0.0172]$

$R2 = [-0.5867 \ -0.4094; -0.4094 \ 0.0834]$

Benders Method is applied to the BMI problem

The method lasts 0.7698 seconds

The method found a feasible solution given in the following

$X = [0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y = [-0.5163 \ 0.0904; 0.0904 \ -0.6643]$

Path Method is applied to the BMI problem

The method lasts 1.8515 seconds

The method found a feasible solution given in the following

$X=[0.9216 \ 0.0790; 0.0790 \ 0.9203]$

$Y=[-0.4492 \ -0.3640; 0.7694 \ -0.4619]$

ILMI Method is applied to the BMI problem

The method lasts 0.6513 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 4.2654 seconds

The method found a feasible solution given in the following

$X=[0.9368 \ -0.2429; -0.2429 \ 0.0672]$

$Y=[-0.8990 \ 0.2498; 0.2298 \ -0.0691]$

BMI problem number 2 in this batch has the following matrices (Rs)

$R1=[0.3729 \ -0.1947; -0.1947 \ -0.1572]$

$R2=[-0.9952 \ 0.2639; 0.2639 \ -0.0389]$

Benders Method is applied to the BMI problem

The method lasts 0.7628 seconds

The method found a feasible solution given in the following

$X=[0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y = [-0.6928 \ 0.0438; 0.0438 \ -0.5735]$

Path Method is applied to the BMI problem

The method lasts 2.4710 seconds

The method found a feasible solution given in the following

$X = [0.9903 \ 0.0505; 0.0505 \ 0.7376]$

$Y = [-0.6185 \ 0.2986; 0.0598 \ -0.7213]$

ILMI Method is applied to the BMI problem

The method lasts 0.6795 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 10.4268 seconds

The method found a feasible solution given in the following

$X = [1.0000 \ -0.0000; -0.0000 \ 0.0002]$

$Y = [-0.9878 \ -0.0022; -0.0027 \ 0.0000]$

BMI problem number 3 in this batch has the following matrices (Rs)

$R1 = [-0.8814 \ -0.3389; -0.3389 \ 0.5112]$

$R2 = [0.5393 \ 0.8229; 0.8229 \ -0.8962]$

Benders Method is applied to the BMI problem

The method lasts 1.9415 seconds

The method found a feasible solution given in the following

$X=[0.7914 \ 0.1325; 0.1325 \ 0.5603]$

$Y=[-0.7873 \ -0.0860; -0.0160 \ -0.7324]$

Path Method is applied to the BMI problem

The method lasts 1.8443 seconds

The method found a feasible solution given in the following

$X=[0.8788 \ 0.1442; 0.1442 \ 0.8285]$

$Y=[-0.6427 \ 0.4131; -0.4353 \ -0.7709]$

ILMI Method is applied to the BMI problem

The method lasts 1.3871 seconds

The method found a feasible solution given in the following

$X=[0.9620 \ 0.0689; 0.0689 \ 0.8750]$

$Y=[-0.9600 \ -0.0492; -0.0103 \ -0.9322]$

Proposed Method is applied to the BMI problem

The method lasts 7.9736 seconds

The method found a feasible solution given in the following

$X=[1.0000 \ -0.0000; -0.0000 \ 1.0000]$

$Y=[-0.9989 \ -0.0024; -0.0024 \ -0.9948]$

BMI problem number 4 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} 0.1972 & -0.0262 \\ -0.0262 & -0.8934 \end{bmatrix}$

$R2 = \begin{bmatrix} -1.0867 & 0.1005 \\ 0.1005 & 0.6897 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 0.7717 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.5000 & 0.0000 \\ 0.0000 & 0.5000 \end{bmatrix}$

$Y = \begin{bmatrix} -0.5219 & -0.0104 \\ -0.0104 & -0.7065 \end{bmatrix}$

Path Method is applied to the BMI problem

The method lasts 2.7495 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.9949 & -0.0230 \\ -0.0230 & 0.8967 \end{bmatrix}$

$Y = \begin{bmatrix} -0.5093 & -0.2157 \\ 0.3663 & -0.8759 \end{bmatrix}$

ILMI Method is applied to the BMI problem

The method lasts 0.7840 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.8743 & -0.2086 \\ -0.2086 & 0.6541 \end{bmatrix}$

$Y = \begin{bmatrix} -0.7016 & 0.1566 \\ -0.0025 & -0.7766 \end{bmatrix}$

Proposed Method is applied to the BMI problem

The method lasts 8.0028 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 1.0000 & -0.0000 \\ -0.0000 & 1.0000 \end{bmatrix}$

$Y = \begin{bmatrix} -0.9917 & -0.0005 \\ -0.0005 & -1.0000 \end{bmatrix}$

BMI problem number 5 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.6370 & 0.2150 \\ 0.2150 & 0.5622 \end{bmatrix}$

$R2 = \begin{bmatrix} -0.3422 & 0.1437 \\ 0.1437 & 0.4472 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 0.8078 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.5000 & 0.0000 \\ 0.0000 & 0.5000 \end{bmatrix}$

$Y = \begin{bmatrix} -0.2771 & -0.0748 \\ -0.0748 & -0.6941 \end{bmatrix}$

Path Method is applied to the BMI problem

The method lasts 0.3785 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.0638 & 0.2343 \\ 0.2343 & 0.9413 \end{bmatrix}$

$Y = \begin{bmatrix} -0.0233 & -0.0944 \\ -0.0123 & -0.3283 \end{bmatrix}$

ILMI Method is applied to the BMI problem

The method lasts 0.7332 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 2.4644 seconds

The method found a feasible solution given in the following

$X = [0.0040 \ 0.0620; 0.0620 \ 0.9961]$

$Y = [-0.0041 \ -0.0635; -0.0633 \ -0.9823]$

BMI problem number 6 in this batch has the following matrices (Rs)

$R1 = [-0.0100 \ -0.1110; -0.1110 \ -0.5167]$

$R2 = [-0.2973 \ -0.5346; -0.5346 \ -0.8530]$

Benders Method is applied to the BMI problem

The method lasts 0.8265 seconds

The method found a feasible solution given in the following

$X = [0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y = [-0.6939 \ 0.0217; 0.0217 \ -0.6714]$

Path Method is applied to the BMI problem

The method lasts 1.0692 seconds

The method found a feasible solution given in the following

$X=[0.9203 \ 0.2698; 0.2698 \ 0.0859]$

$Y=[-0.1333 \ -0.0601; -0.4070 \ -0.0459]$

ILMI Method is applied to the BMI problem

The method lasts 0.7131 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 2.1779 seconds

The method found a feasible solution given in the following

$X=[0.7638 \ 0.4247; 0.4247 \ 0.2362]$

$Y=[-0.7636 \ -0.4244; -0.4244 \ -0.2359]$

BMI problem number 7 in this batch has the following matrices (Rs)

$R1=[-0.2019 \ 0.3997; 0.3997 \ -0.7621]$

$R2=[0.1640 \ 0.0361; 0.0361 \ 0.6399]$

Benders Method is applied to the BMI problem

The method lasts 0.7540 seconds

The method found a feasible solution given in the following

$X=[0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y=[-0.6004 \ -0.0080; -0.0080 \ -0.7065]$

Path Method is applied to the BMI problem

The method lasts 1.2344 seconds

The method found a feasible solution given in the following

$X=[0.6211 \ 0.1289; 0.1289 \ 0.9561]$

$Y=[-0.3942 \ 0.6141; -0.2989 \ -0.6280]$

ILMI Method is applied to the BMI problem

The method lasts 0.7438 seconds

The method found a feasible solution given in the following

$X=[0.9939 \ 0.0216; 0.0216 \ 0.9238]$

$Y=[-0.8630 \ -0.0155; 0.0020 \ -0.9608]$

Proposed Method is applied to the BMI problem

The method lasts 11.8395 seconds

The method found a feasible solution given in the following

$X=[1.0000 \ -0.0000; -0.0000 \ 1.0000]$

$Y=[-0.9827 \ -0.0013; -0.0013 \ -0.9999]$

BMI problem number 8 in this batch has the following matrices (Rs)

$R1=[-0.8004 \ 0.6528; 0.6528 \ 0.3018]$

$R2=[-0.1349 \ -0.2084; -0.2084 \ -0.2172]$

Benders Method is applied to the BMI problem

The method lasts 0.7626 seconds

The method found a feasible solution given in the following

$X = [0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y = [-0.5688 \ -0.0642; -0.0642 \ -0.6773]$

Path Method is applied to the BMI problem

The method lasts 0.7845 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.6777 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 2.3139 seconds

The method found a feasible solution given in the following

$X = [0.0438 \ 0.2041; 0.2041 \ 0.9564]$

$Y = [-0.0419 \ -0.1988; -0.1991 \ -0.9434]$

BMI problem number 9 in this batch has the following matrices (Rs)

$R1=[0.0821 \ -0.0220;-0.0220 \ 0.0680]$

$R2=[-1.0829 \ 0.4688;0.4688 \ 0.0778]$

Benders Method is applied to the BMI problem

The method lasts 0.8064 seconds

The method found a feasible solution given in the following

$X=[0.5000 \ 0.0000;0.0000 \ 0.5000]$

$Y=[-0.6558 \ -0.0181;-0.0181 \ -0.7007]$

Path Method is applied to the BMI problem

The method lasts 0.3488 seconds

The method found a feasible solution given in the following

$X=[0.8435 \ 0.0518;0.0518 \ 0.9829]$

$Y=[-0.7548 \ 0.2576;0.0415 \ -0.7938]$

ILMI Method is applied to the BMI problem

The method lasts 1.2846 seconds

The method found a feasible solution given in the following

$X=[0.6524 \ 0.1117;0.1117 \ 0.9641]$

$Y=[-0.7785 \ 0.0141;0.0196 \ -0.7445]$

Proposed Method is applied to the BMI problem

The method lasts 19.8454 seconds

The method found a feasible solution given in the following

$X=[1.0000 \ 0.0002;0.0002 \ 0.9396]$

Y=[-0.9898 -0.0124;0.0058 -0.9682]

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[0.7452 -0.4032;-0.4032 -0.2230]

R2=[-0.1993 -0.2451;-0.2451 0.4091]

Benders Method is applied to the BMI problem

The method lasts 4.3217 seconds

The method found a feasible solution given in the following

X=[0.8109 -0.1125;-0.1125 0.5407]

Y=[-0.8465 0.1432;-0.0164 -0.7212]

Path Method is applied to the BMI problem

The method lasts 7.0270 seconds

The method found a feasible solution given in the following

X=[0.7700 -0.2956;-0.2956 0.6202]

Y=[-0.2742 -0.3365;0.6724 -0.5730]

ILMI Method is applied to the BMI problem

The method lasts 1.2215 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 16.6306 seconds

The method found a feasible solution given in the following

$X = [0.8565 \ -0.2344; -0.2344 \ 0.6170]$

$Y = [-0.8807 \ 0.2373; 0.0030 \ -0.7443]$

From here, 10 BMIs in the batch related to $n=2$ and $r=3$ are presented

BMI problem number 1 in this batch has the following matrices (R_s)

$R_1 = [0.7536 \ -0.6521; -0.6521 \ -0.4697]$

$R_2 = [-0.8988 \ -0.4260; -0.4260 \ -0.1961]$

$R_3 = [-0.1019 \ 0.6813; 0.6813 \ -0.6274]$

Benders Method is applied to the BMI problem

The method lasts 1.9056 seconds

The method found a feasible solution given in the following

$X = [0.7961 \ -0.1282; -0.1282 \ 0.5555]$

$Y = [-0.8730 \ -0.0064; 0.1761 \ -0.7435]$

Path Method is applied to the BMI problem

The method lasts 5.7943 seconds

The method found a feasible solution given in the following

$X = [0.9842 \ 0.0158; 0.0158 \ 0.9843]$

Y=[-0.7372 0.4096;0.1048 -0.6813]

ILMI Method is applied to the BMI problem

The method lasts 1.1552 seconds

The method found a feasible solution given in the following

X=[0.5886 -0.2595;-0.2595 0.8364]

Y=[-0.7492 0.1643;0.1400 -0.8896]

Proposed Method is applied to the BMI problem

The method lasts 4.6590 seconds

The method found a feasible solution given in the following

X=[0.9311 -0.2530;-0.2530 0.0714]

Y=[-0.9222 0.2430;0.2418 -0.0633]

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[-0.6806 0.1913;0.1913 0.1185]

R2=[-0.8054 -0.1182;-0.1182 0.0000]

R3=[-0.9385 0.5134;0.5134 -0.2704]

Benders Method is applied to the BMI problem

The method lasts 0.8929 seconds

The method found a feasible solution given in the following

$X=[0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y=[-0.5144 \ -0.0438; -0.0438 \ -0.6972]$

Path Method is applied to the BMI problem

The method lasts 0.3598 seconds

The method found a feasible solution given in the following

$X=[0.7952 \ 0.0387; 0.0387 \ 0.9927]$

$Y=[-0.8224 \ -0.3895; -0.0593 \ -0.2697]$

ILMI Method is applied to the BMI problem

The method lasts 0.8393 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 7.2521 seconds

The method found a feasible solution given in the following

$X=[0.3432 \ -0.4748; -0.4748 \ 0.6568]$

$Y=[-0.3432 \ 0.4748; 0.4748 \ -0.6568]$

BMI problem number 3 in this batch has the following matrices (Rs)

$R1=[-0.4275 \ 0.6927; 0.6927 \ -0.3426]$

$R2=[-0.4760 \ 0.4159; 0.4159 \ -0.3620]$

$R3 = [-1.0110 \ -0.3097; -0.3097 \ -0.0601]$

Benders Method is applied to the BMI problem

The method lasts 0.8207 seconds

The method found a feasible solution given in the following

$X = [0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y = [-0.6392 \ -0.0639; -0.0639 \ -0.6470]$

Path Method is applied to the BMI problem

The method lasts 2.7457 seconds

The method found a feasible solution given in the following

$X = [0.9486 \ -0.1522; -0.1522 \ 0.5496]$

$Y = [-0.5025 \ 0.1324; -0.7495 \ -0.2250]$

ILMI Method is applied to the BMI problem

The method lasts 0.7048 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 28.8398 seconds

The method found a feasible solution given in the following

$X = [1.0000 \ -0.0000; -0.0000 \ 1.0000]$

$Y = [-0.9926 \ -0.0069; -0.0069 \ -0.9935]$

BMI problem number 4 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} 0.4696 & 0.5173 \\ 0.5173 & -1.0567 \end{bmatrix}$

$R2 = \begin{bmatrix} -0.7914 & 0.7338 \\ 0.7338 & -0.6748 \end{bmatrix}$

$R3 = \begin{bmatrix} 0.4329 & -0.1409 \\ -0.1409 & 0.2229 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 0.7980 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.5000 & 0.0000 \\ 0.0000 & 0.5000 \end{bmatrix}$

$Y = \begin{bmatrix} -0.7027 & -0.0144 \\ -0.0144 & -0.6603 \end{bmatrix}$

Path Method is applied to the BMI problem

The method lasts 5.5897 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.9592 & -0.1301 \\ -0.1301 & 0.5850 \end{bmatrix}$

$Y = \begin{bmatrix} -0.4996 & 0.1956 \\ -0.5483 & -0.3894 \end{bmatrix}$

ILMI Method is applied to the BMI problem

The method lasts 3.0197 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.9808 & 0.0593 \\ 0.0593 & 0.8172 \end{bmatrix}$

$Y = \begin{bmatrix} -0.9449 & 0.0279 \\ -0.0316 & -0.8821 \end{bmatrix}$

Proposed Method is applied to the BMI problem

The method lasts 7.3497 seconds

The method found a feasible solution given in the following

$X = [1.0000 \ -0.0000; -0.0000 \ 1.0000]$

$Y = [-0.9995 \ -0.0015; -0.0015 \ -0.9951]$

BMI problem number 5 in this batch has the following matrices (Rs)

$R1 = [0.5105 \ 0.1416; 0.1416 \ -0.4355]$

$R2 = [0.2603 \ 0.7621; 0.7621 \ -0.8472]$

$R3 = [0.3133 \ -0.7931; -0.7931 \ -0.3503]$

Benders Method is applied to the BMI problem

The method lasts 4.7696 seconds

The method found a feasible solution given in the following

$X = [0.7437 \ -0.1622; -0.1622 \ 0.6080]$

$Y = [-0.8126 \ -0.0257; 0.1337 \ -0.6953]$

Path Method is applied to the BMI problem

The method lasts 1.4811 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.2370 seconds

The method found a feasible solution given in the following

$X = [0.9951 \ -0.0526; -0.0526 \ 0.4316]$

$Y = [-0.9750 \ 0.1679; -0.1584 \ -0.6300]$

Proposed Method is applied to the BMI problem

The method lasts 9.5704 seconds

The method found a feasible solution given in the following

$X = [0.9748 \ -0.1565; -0.1565 \ 0.0275]$

$Y = [-0.9714 \ 0.1515; 0.1516 \ -0.0237]$

BMI problem number 6 in this batch has the following matrices (Rs)

$R1 = [-0.1868 \ 0.1374; 0.1374 \ 0.5620]$

$R2 = [0.2382 \ -0.6249; -0.6249 \ -0.3469]$

$R3 = [-0.4646 \ -0.6053; -0.6053 \ 0.4549]$

Benders Method is applied to the BMI problem

The method lasts 3.5359 seconds

The method found a feasible solution given in the following

$X = [0.5695 \ -0.1400; -0.1400 \ 0.7822]$

$Y = [-0.7346 \ 0.1779; -0.0170 \ -0.8552]$

Path Method is applied to the BMI problem

The method lasts 7.0384 seconds

The method found a feasible solution given in the following

$X=[1.0000 \ -0.0003;-0.0003 \ 0.9015]$

$Y=[-0.2696 \ 0.5245;-0.2576 \ -0.6305]$

ILMI Method is applied to the BMI problem

The method lasts 1.2259 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 27.3716 seconds

The method found a feasible solution given in the following

$X=[0.9236 \ -0.1693;-0.1693 \ 0.6250]$

$Y=[-0.9202 \ 0.1182;0.0450 \ -0.7761]$

BMI problem number 7 in this batch has the following matrices (Rs)

$R1=[-0.1385 \ 0.7384;0.7384 \ -0.8663]$

$R2=[0.1055 \ -0.3782;-0.3782 \ -0.1991]$

$R3=[-0.2169 \ 0.2013;0.2013 \ 0.2173]$

Benders Method is applied to the BMI problem

The method lasts 0.8794 seconds

The method found a feasible solution given in the following

$X=[0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y=[-0.7034 \ 0.0055; 0.0055 \ -0.6990]$

Path Method is applied to the BMI problem

The method lasts 1.9058 seconds

The method found a feasible solution given in the following

$X=[0.9702 \ -0.1148; -0.1148 \ 0.5587]$

$Y=[-0.4237 \ 0.2379; -0.6569 \ -0.3074]$

ILMI Method is applied to the BMI problem

The method lasts 0.6501 seconds

The method found a feasible solution given in the following

$X=[0.6987 \ 0.2129; 0.2129 \ 0.8495]$

$Y=[-0.7654 \ -0.0309; -0.0364 \ -0.7856]$

Proposed Method is applied to the BMI problem

The method lasts 20.0900 seconds

The method found a feasible solution given in the following

$X=[1.0000 \ 0.0000; 0.0000 \ 0.3628]$

$Y=[-0.9141 \ -0.0638; 0.0739 \ -0.5979]$

BMI problem number 8 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.3820 & 0.5989 \\ 0.5989 & -0.0892 \end{bmatrix}$

$R2 = \begin{bmatrix} -0.1725 & 0.2246 \\ 0.2246 & -0.1179 \end{bmatrix}$

$R3 = \begin{bmatrix} 0.3987 & -0.1245 \\ -0.1245 & -0.4294 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 0.7636 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.5000 & 0.0000 \\ 0.0000 & 0.5000 \end{bmatrix}$

$Y = \begin{bmatrix} -0.7069 & 0.0015 \\ 0.0015 & -0.6967 \end{bmatrix}$

Path Method is applied to the BMI problem

The method lasts 2.6479 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.9685 & 0.1465 \\ 0.1465 & 0.3178 \end{bmatrix}$

$Y = \begin{bmatrix} -0.5717 & -0.0040 \\ -0.7740 & -0.3115 \end{bmatrix}$

ILMI Method is applied to the BMI problem

The method lasts 1.4458 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.9497 & -0.1320 \\ -0.1320 & 0.6532 \end{bmatrix}$

$Y = \begin{bmatrix} -0.8283 & -0.0501 \\ 0.0298 & -0.7508 \end{bmatrix}$

Proposed Method is applied to the BMI problem

The method lasts 11.2845 seconds

The method found a feasible solution given in the following

$X = [0.9455 \ 0.2269; 0.2269 \ 0.0547]$

$Y = [-0.9440 \ -0.2274; -0.2270 \ -0.0548]$

BMI problem number 9 in this batch has the following matrices (Rs)

$R1 = [-0.9551 \ -0.1092; -0.1092 \ -0.0055]$

$R2 = [-0.4851 \ 0.3526; 0.3526 \ -0.1640]$

$R3 = [-0.4675 \ 0.7015; 0.7015 \ -1.0448]$

Benders Method is applied to the BMI problem

The method lasts 0.7685 seconds

The method found a feasible solution given in the following

$X = [0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y = [-0.6697 \ -0.0241; -0.0241 \ -0.6916]$

Path Method is applied to the BMI problem

The method lasts 0.3366 seconds

The method found a feasible solution given in the following

$X = [0.9694 \ 0.0542; 0.0542 \ 0.9041]$

$Y = [-0.3951 \ 0.1231; 0.2392 \ -0.5557]$

ILMI Method is applied to the BMI problem

The method lasts 0.6677 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 6.6928 seconds

The method found a feasible solution given in the following

$X = [0.0000 \ 0.0000; -0.0000 \ 1.0000]$

$Y = [-0.0000 \ -0.0000; -0.0000 \ -1.0000]$

BMI problem number 10 in this batch has the following matrices (Rs)

$R1 = [-0.0600 \ 0.1724; 0.1724 \ -0.3935]$

$R2 = [0.2283 \ 0.1517; 0.1517 \ -0.7759]$

$R3 = [-0.3835 \ -0.4855; -0.4855 \ 0.4122]$

Benders Method is applied to the BMI problem

The method lasts 0.8785 seconds

The method found a feasible solution given in the following

$X = [0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y = [-0.6356 \ 0.0338; 0.0338 \ -0.6911]$

Path Method is applied to the BMI problem

The method lasts 1.8647 seconds

The method found a feasible solution given in the following

$X=[0.5303 \ -0.4819;-0.4819 \ 0.5057]$

$Y=[-0.1292 \ -0.1389;0.7167 \ -0.6974]$

ILMI Method is applied to the BMI problem

The method lasts 0.6876 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 25.9901 seconds

The method found a feasible solution given in the following

$X=[0.6621 \ -0.4730;-0.4730 \ 0.3379]$

$Y=[-0.6621 \ 0.4730;0.4730 \ -0.3379]$

From here, 10 BMIs in the batch related to $n=2$ and $r=4$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

$R1=[0.6111 \ 0.1059;0.1059 \ 0.5891]$

$R2=[0.2639 \ -0.7561;-0.7561 \ -1.1456]$

$R3=[0.4979 \ -0.2273;-0.2273 \ 0.7797]$

$R4=[-0.8432 \ -0.8924;-0.8924 \ 0.5434]$

Benders Method is applied to the BMI problem

The method lasts 1.8803 seconds

The method found a feasible solution given in the following

$X=[0.5680 \ 0.1389;-0.1389 \ 0.7837]$

$Y=[-0.7339 \ 0.0733;0.0428 \ -0.8300]$

Path Method is applied to the BMI problem

The method lasts 3.6342 seconds

The method found a feasible solution given in the following

$X=[0.9519 \ 0.0439;0.0439 \ 0.9600]$

$Y=[-0.8412 \ 0.0797;0.2373 \ -0.7260]$

ILMI Method is applied to the BMI problem

The method lasts 0.7396 seconds

The method found a feasible solution given in the following

$X=[0.6902 \ 0.1044;0.1044 \ 0.9648]$

$Y=[-0.7998 \ -0.0712;0.0333 \ -0.9147]$

Proposed Method is applied to the BMI problem

The method lasts 32.2000 seconds

The method found a feasible solution given in the following

$X=[0.9149 \ -0.1786;-0.1786 \ 0.6250]$

$Y=[-0.9345 \ 0.0759;0.1188 \ -0.7818]$

BMI problem number 2 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.5629 & -0.5794 \\ -0.5794 & -0.5409 \end{bmatrix}$

$R2 = \begin{bmatrix} 0.1063 & 0.1185 \\ 0.1185 & -0.6251 \end{bmatrix}$

$R3 = \begin{bmatrix} -0.3440 & 0.0395 \\ 0.0395 & -0.0041 \end{bmatrix}$

$R4 = \begin{bmatrix} -0.5795 & -0.2450 \\ -0.2450 & -0.0866 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 0.7799 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.5000 & 0.0000 \\ 0.0000 & 0.5000 \end{bmatrix}$

$Y = \begin{bmatrix} -0.7067 & -0.0028 \\ -0.0028 & -0.6895 \end{bmatrix}$

Path Method is applied to the BMI problem

The method lasts 1.2268 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.9725 & -0.1510 \\ -0.1510 & 0.1711 \end{bmatrix}$

$Y = \begin{bmatrix} -0.1972 & 0.0205 \\ -0.6358 & -0.1892 \end{bmatrix}$

ILMI Method is applied to the BMI problem

The method lasts 0.8080 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 5.1433 seconds

The method found a feasible solution given in the following

$X = [0.5155 \ -0.4986; -0.4986 \ 0.4868]$

$Y = [-0.4999 \ 0.4693; 0.4859 \ -0.4618]$

BMI problem number 3 in this batch has the following matrices (Rs)

$R1 = [-0.2313 \ 0.4562; 0.4562 \ -0.2508]$

$R2 = [0.6756 \ -0.1003; -0.1003 \ 0.7377]$

$R3 = [0.0206 \ 0.0459; 0.0459 \ 0.2736]$

$R4 = [0.3424 \ -0.1047; -0.1047 \ -0.4640]$

Benders Method is applied to the BMI problem

The method lasts 2.2088 seconds

The method found a feasible solution given in the following

$X = [0.6238 \ -0.1680; -0.1680 \ 0.7278]$

$Y = [-0.7393 \ 0.0436; 0.0436 \ -0.7663]$

Path Method is applied to the BMI problem

The method lasts 4.7592 seconds

The method found a feasible solution given in the following

$X = [0.8508 \ -0.2176; -0.2176 \ 0.6824]$

$Y = [-0.4735 \ -0.0385; -0.1477 \ -0.6011]$

ILMI Method is applied to the BMI problem

The method lasts 0.8340 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 40.0130 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.6250 & 0.0000 \\ 0.0000 & 1.0000 \end{bmatrix}$

$Y = \begin{bmatrix} -0.7895 & -0.0262 \\ 0.0297 & -0.9595 \end{bmatrix}$

BMI problem number 4 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.5297 & -0.3891 \\ -0.3891 & -0.2691 \end{bmatrix}$

$R2 = \begin{bmatrix} 0.2511 & -0.2082 \\ -0.2082 & -1.0254 \end{bmatrix}$

$R3 = \begin{bmatrix} -0.3039 & 0.2283 \\ 0.2283 & -0.1307 \end{bmatrix}$

$R4 = \begin{bmatrix} 0.2611 & -0.4448 \\ -0.4448 & -0.3372 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 0.7624 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.5000 & 0.0000 \\ 0.0000 & 0.5000 \end{bmatrix}$

$Y = \begin{bmatrix} -0.6702 & 0.0693 \\ 0.0693 & -0.5770 \end{bmatrix}$

Path Method is applied to the BMI problem

The method lasts 2.5357 seconds

The method found a feasible solution given in the following

$X=[1.0000 \ -0.0000;-0.0000 \ 1.0000]$

$Y=[-0.9402 \ 0.3208;0.0774 \ -0.1255]$

ILMI Method is applied to the BMI problem

The method lasts 0.7035 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 7.8271 seconds

The method found a feasible solution given in the following

$X=[1.0000 \ -0.0000;-0.0000 \ 0.0000]$

$Y=[-0.9982 \ -0.0004;-0.0003 \ -0.0000]$

BMI problem number 5 in this batch has the following matrices (Rs)

$R1=[-0.0419 \ 0.1942;0.1942 \ 0.3818]$

$R2=[-0.0469 \ 0.1095;0.1095 \ -0.0570]$

$R3=[-0.4013 \ -0.4401;-0.4401 \ -0.3950]$

$R4=[0.3241 \ 0.3582;0.3582 \ -0.9127]$

Benders Method is applied to the BMI problem

The method lasts 0.8513 seconds

The method found a feasible solution given in the following

$X=[0.5000 \ 0.0000; 0.0000 \ 0.5000]$

$Y=[-0.6960 \ -0.0043; -0.0043 \ -0.7054]$

Path Method is applied to the BMI problem

The method lasts 2.7703 seconds

The method found a feasible solution given in the following

$X=[0.8552 \ 0.2346; 0.2346 \ 0.6199]$

$Y=[-0.3435 \ 0.2670; -0.3108 \ -0.7274]$

ILMI Method is applied to the BMI problem

The method lasts 1.4129 seconds

The method found a feasible solution given in the following

$X=[0.6574 \ 0.0603; 0.0603 \ 0.9894]$

$Y=[-0.8036 \ 0.0117; -0.1005 \ -0.8789]$

Proposed Method is applied to the BMI problem

The method lasts 20.1654 seconds

The method found a feasible solution given in the following

$X=[0.6250 \ 0.0000; 0.0000 \ 1.0000]$

$Y=[-0.7883 \ 0.0396; -0.0441 \ -0.9617]$

BMI problem number 6 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.5327 & 0.0560 \\ 0.0560 & 0.0076 \end{bmatrix}$

$R2 = \begin{bmatrix} 0.5186 & 0.0083 \\ 0.0083 & -0.6666 \end{bmatrix}$

$R3 = \begin{bmatrix} 0.0485 & -0.0093 \\ -0.0093 & -0.0049 \end{bmatrix}$

$R4 = \begin{bmatrix} -0.0331 & 0.5772 \\ 0.5772 & -0.2840 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 0.7729 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.5000 & 0.0000 \\ 0.0000 & 0.5000 \end{bmatrix}$

$Y = \begin{bmatrix} -0.7071 & -0.0003 \\ -0.0003 & -0.6626 \end{bmatrix}$

Path Method is applied to the BMI problem

The method lasts 1.7949 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.9456 & 0.1897 \\ 0.1897 & 0.3381 \end{bmatrix}$

$Y = \begin{bmatrix} -0.2729 & 0.1861 \\ -0.6193 & -0.4842 \end{bmatrix}$

ILMI Method is applied to the BMI problem

The method lasts 1.3209 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.9995 & 0.0059 \\ 0.0059 & 0.9337 \end{bmatrix}$

Y=[-0.9997 0.0001;-0.0062 -0.9604]

Proposed Method is applied to the BMI problem

The method lasts 7.0811 seconds

The method found a feasible solution given in the following

X=[1.0000 -0.0000;-0.0000 1.0000]

Y=[-1.0000 -0.0000;-0.0000 -0.9975]

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[0.6728 -0.0418;-0.0418 -0.3919]

R2=[-0.4149 -0.6005;-0.6005 0.7905]

R3=[-0.6391 -0.2685;-0.2685 0.6744]

R4=[0.5155 0.3323;0.3323 0.1321]

Benders Method is applied to the BMI problem

The method lasts 2.1295 seconds

The method found a feasible solution given in the following

X=[0.5513 -0.1241;-0.1241 0.8004]

Y=[-0.7216 0.0589;0.0241 -0.8181]

Path Method is applied to the BMI problem

The method lasts 0.8281 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.7161 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 22.8952 seconds

The method found a feasible solution given in the following

$X = [0.9101 \ -0.1836; -0.1836 \ 0.6250]$

$Y = [-0.9526 \ 0.1512; 0.0510 \ -0.7760]$

BMI problem number 8 in this batch has the following matrices (Rs)

$R1 = [-0.5567 \ -0.2964; -0.2964 \ -0.0845]$

$R2 = [-0.5536 \ -0.1833; -0.1833 \ -0.0272]$

$R3 = [0.7491 \ -0.5305; -0.5305 \ 0.3064]$

$R4 = [-0.9540 \ -0.5948; -0.5948 \ 0.2626]$

Benders Method is applied to the BMI problem

The method lasts 1.9773 seconds

The method found a feasible solution given in the following

$X = [0.7435 \ -0.1623; -0.1623 \ 0.6081]$

$Y = [-0.8388 \ 0.1261; 0.1261 \ -0.7336]$

Path Method is applied to the BMI problem

The method lasts 0.3878 seconds

The method found a feasible solution given in the following

$X = [0.8514 \ -0.2368; -0.2368 \ 0.6225]$

$Y = [-0.8668 \ 0.3405; -0.2290 \ -0.6076]$

ILMI Method is applied to the BMI problem

The method lasts 0.7354 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 18.2799 seconds

The method found a feasible solution given in the following

$X = [0.6250 \ 0.0000; 0.0000 \ 0.8500]$

$Y = [-0.7719 \ -0.0182; 0.0801 \ -0.8496]$

BMI problem number 9 in this batch has the following matrices (Rs)

$R1 = [-0.9958 \ -0.2655; -0.2655 \ 0.4260]$

$R2 = [-0.5484 \ -0.2808; -0.2808 \ 0.0255]$

$R3 = [-0.9791 \ -0.7582; -0.7582 \ -0.5559]$

R4=[-0.7556 -0.2942;-0.2942 -0.0847]

Benders Method is applied to the BMI problem

The method lasts 0.7854 seconds

The method found a feasible solution given in the following

X=[0.5000 0.0000;0.0000 0.5000]

Y=[-0.5146 0.0348;0.0348 -0.7008]

Path Method is applied to the BMI problem

The method lasts 1.8167 seconds

The method found a feasible solution given in the following

X=[0.2464 0.0873;0.0873 0.9899]

Y=[-0.3915 -0.7243;0.2761 -0.4853]

ILMI Method is applied to the BMI problem

The method lasts 0.6601 seconds

The method found a feasible solution given in the following

X=[0.9834 -0.0495;-0.0495 0.8522]

Y=[-0.8329 0.0684;0.0130 -0.9199]

Proposed Method is applied to the BMI problem

The method lasts 6.9183 seconds

The method found a feasible solution given in the following

X=[0.0000 -0.0000;-0.0000 1.0000]

Y=[-0.0000 0.0002;0.0002 -0.9994]

BMI problem number 10 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.3490 & -0.0417 \\ -0.0417 & 0.5950 \end{bmatrix}$

$R2 = \begin{bmatrix} -0.5245 & -0.5794 \\ -0.5794 & -0.6358 \end{bmatrix}$

$R3 = \begin{bmatrix} 0.0714 & 0.2086 \\ 0.2086 & -0.1855 \end{bmatrix}$

$R4 = \begin{bmatrix} -0.0413 & 0.4897 \\ 0.4897 & -0.0023 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 0.7720 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.5000 & 0.0000 \\ 0.0000 & 0.5000 \end{bmatrix}$

$Y = \begin{bmatrix} -0.6740 & 0.0015 \\ 0.0015 & -0.7070 \end{bmatrix}$

Path Method is applied to the BMI problem

The method lasts 1.8064 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.7342 & -0.1232 \\ -0.1232 & 0.9429 \end{bmatrix}$

$Y = \begin{bmatrix} -0.8063 & 0.3518 \\ -0.2752 & -0.3004 \end{bmatrix}$

ILMI Method is applied to the BMI problem

The method lasts 0.6921 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 15.7750 seconds

The method found a feasible solution given in the following

$X=[0.1127 \ 0.3157; 0.3157 \ 0.8877]$

$Y=[-0.1128 \ -0.3139; -0.3145 \ -0.8759]$

From here, 10 BMIs in the batch related to $n=3$ and $r=1$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

$R1=[0.5737 \ -0.0606 \ 0.2283; -0.0606 \ -0.7183 \ 0.7871; 0.2283 \ 0.7871 \ 0.2718]$

Benders Method is applied to the BMI problem

The method lasts 3.7219 seconds

The method found a feasible solution given in the following

$X=[0.6178 \ 0.0718 \ 0.1500; 0.0718 \ 0.5437 \ 0.0914; 0.1500 \ 0.0914 \ 0.6911]$

$Y=[-0.7383 \ 0.0238 \ -0.0719; 0.0238 \ -0.2985 \ -0.2660; -0.0719 \ -0.2660 \ -0.6317]$

Path Method is applied to the BMI problem

The method lasts 1.9723 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.4642 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 36.8334 seconds

The method found a feasible solution given in the following

$X = [1.0000 \ 0.0000 \ 0.0000; 0.0000 \ 0.1018 \ 0.2121; 0.0000 \ 0.2121 \ 0.9499]$

$Y = [-0.8874 \ 0.0050 \ -0.0305; 0.0527 \ -0.0592 \ -0.3455; -0.0218 \ -0.2822 \ -0.8439]$

BMI problem number 2 in this batch has the following matrices (Rs)

$R1 = [-0.7839 \ -0.4113 \ -0.1446; -0.4113 \ 0.5864 \ 0.4834; -0.1446 \ 0.4834 \ -0.1353]$

Benders Method is applied to the BMI problem

The method lasts 1.8887 seconds

The method found a feasible solution given in the following

$X = [0.5210 \ -0.0750 \ -0.0366; -0.0750 \ 0.7678 \ 0.1308; -0.0366 \ 0.1308 \ 0.5639]$

$Y = [-0.2070 \ 0.1711 \ 0.0604; 0.1711 \ -0.7768 \ -0.2021; 0.0604 \ -0.2021 \ -0.4749]$

Path Method is applied to the BMI problem

The method lasts 0.8471 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.7204 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 3.5399 seconds

The method found a feasible solution given in the following

$X = [0.4830 \ 0.1208 \ -0.2900; 0.1208 \ 0.7623 \ 0.3600; -0.2900 \ 0.3600 \ 0.4297]$

$Y = [-0.4155 \ -0.1109 \ 0.2454; -0.1551 \ -0.7766 \ -0.3425; 0.2194 \ -0.3756 \ -0.3860]$

BMI problem number 3 in this batch has the following matrices (Rs)

$R1 = [-0.0621 \ 0.0747 \ 0.2109; 0.0747 \ -1.0316 \ 0.4232; 0.2109 \ 0.4232 \ 0.4884]$

Benders Method is applied to the BMI problem

The method lasts 0.7519 seconds

The method found a feasible solution given in the following

$X = [0.5000 \ 0.0000 \ 0.0000; 0.0000 \ 0.5000 \ 0.0000; 0.0000 \ 0.0000 \ 0.5000]$

$Y = [-0.4280 \ -0.0261 \ -0.0815; -0.0261 \ -0.1905 \ -0.1277; -0.0815 \ -0.1277 \ -0.6477]$

Path Method is applied to the BMI problem

The method lasts 0.7448 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.7623 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 14.9849 seconds

The method found a feasible solution given in the following

$X = [0.5909 \ 0.0000 \ 0.4073; 0.0000 \ 1.0000 \ -0.0000; 0.4073 \ -0.0000 \ 0.5945]$

$Y = [-0.6419 \ -0.3343 \ -0.3952; 0.1327 \ -0.5818 \ -0.0389; -0.0528 \ -0.0102 \ -0.5718]$

BMI problem number 4 in this batch has the following matrices (Rs)

$R1 = [0.5695 \ 0.4202 \ 0.4825; 0.4202 \ -0.8945 \ 0.6517; 0.4825 \ 0.6517 \ -0.4087]$

Benders Method is applied to the BMI problem

The method lasts 1.8661 seconds

The method found a feasible solution given in the following

$X = [0.7437 \ 0.0988 \ 0.1295; 0.0988 \ 0.5401 \ 0.0525; 0.1295 \ 0.0525 \ 0.5688]$

$Y = [-0.7585 \ -0.1588 \ -0.1891; -0.1588 \ -0.2644 \ -0.2038; -0.1891 \ -0.2038 \ -0.4120]$

Path Method is applied to the BMI problem

The method lasts 0.7691 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.7138 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 5.6191 seconds

The method found a feasible solution given in the following

$X = [0.8135 \ 0.2072 \ 0.3279; 0.2072 \ 0.5849 \ -0.2097; 0.3279 \ -0.2097 \ 0.2939]$

$Y = [-0.8048 \ -0.2528 \ -0.2985; -0.2441 \ -0.3920 \ 0.0833; -0.3033 \ 0.0785 \ -0.2083]$

BMI problem number 5 in this batch has the following matrices (Rs)

$R1 = [0.1206 \ -0.0170 \ 0.8271; -0.0170 \ -0.8111 \ 0.9246; 0.8271 \ 0.9246 \ 0.6831]$

Benders Method is applied to the BMI problem

The method lasts 1.9366 seconds

The method found a feasible solution given in the following

$X = [0.5803 \ 0.0539 \ 0.1377; 0.0539 \ 0.5361 \ 0.0924; 0.1377 \ 0.0924 \ 0.7362]$

$Y = [-0.4357 \ -0.0441 \ -0.2672; -0.0441 \ -0.2316 \ -0.2449; -0.2672 \ -0.2449 \ -0.6717]$

Path Method is applied to the BMI problem

The method lasts 1.2136 seconds

The method found a feasible solution given in the following

$X=[0.4327 \ 0.3004 \ 0.2598; 0.3004 \ 0.6201 \ 0.0343; 0.2598 \ 0.0343 \ 0.7471]$

$Y=[-0.0652 \ 0.2803 \ -0.7131; -0.3881 \ -0.0534 \ -0.3645; -0.4079 \ -0.7339 \ -0.2919]$

ILMI Method is applied to the BMI problem

The method lasts 0.7120 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 40.5846 seconds

The method found a feasible solution given in the following

$X=[0.2911 \ -0.0000 \ 0.4003; -0.0000 \ 1.0000 \ -0.0000; 0.4003 \ -0.0000 \ 0.7740]$

$Y=[-0.3238 \ 0.0431 \ -0.3088; 0.0019 \ -0.6060 \ -0.3404; -0.4291 \ 0.0090 \ -0.7046]$

BMI problem number 6 in this batch has the following matrices (Rs)

$R1=[-0.5360 \ -0.4169 \ 0.2913; -0.4169 \ -0.5177 \ 0.2681; 0.2913 \ 0.2681 \ 0.0608]$

Benders Method is applied to the BMI problem

The method lasts 2.2960 seconds

The method found a feasible solution given in the following

$X=[0.5000 \ 0.0000 \ 0.0000; 0.0000 \ 0.5000 \ 0.0000; 0.0000 \ 0.0000 \ 0.5000]$

Y=[-0.3982 0.1592 -0.1191;0.1592 -0.4045 -0.1086;-0.1191 -0.1086 -0.6511]

Path Method is applied to the BMI problem

The method lasts 1.9478 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.4430 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 11.3688 seconds

The method found a feasible solution given in the following

X=[0.4982 0.0025 0.4997;0.0025 0.9960 -0.0009;0.4997 -0.0009 0.5018]

Y=[-0.4131 -0.0894 -0.4168;-0.0959 -0.8972 -0.0920;-0.4148 -0.0877 -0.4185]

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[0.4664 0.2180 0.4138;0.2180 -0.4720 -0.0304;0.4138 -0.0304 -0.5340]

Benders Method is applied to the BMI problem

The method lasts 0.7255 seconds

The method found a feasible solution given in the following

$X=[0.5000 \ 0.0000 \ 0.0000;0.0000 \ 0.5000 \ 0.0000;0.0000 \ 0.0000 \ 0.5000]$

$Y=[-0.6338 \ -0.0878 \ -0.1654;-0.0878 \ -0.2198 \ -0.0067;-0.1654 \ -0.0067 \ -0.2240]$

Path Method is applied to the BMI problem

The method lasts 0.8195 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.6596 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 6.1512 seconds

The method found a feasible solution given in the following

$X=[0.8926 \ 0.1587 \ 0.2613;0.1587 \ 0.2261 \ -0.0000;0.2613 \ -0.0000 \ 0.0874]$

$Y=[-0.7983 \ -0.0466 \ -0.2547;-0.2157 \ -0.4516 \ 0.0346;-0.2163 \ 0.0905 \ -0.0933]$

BMI problem number 8 in this batch has the following matrices (Rs)

$R1=[-0.7849 \ 0.0458 \ 0.4331;0.0458 \ -0.6062 \ 0.0433;0.4331 \ 0.0433 \ 0.6170]$

Benders Method is applied to the BMI problem

The method lasts 2.2564 seconds

The method found a feasible solution given in the following

$X=[0.5264 \ 0.0039 \ 0.0928; 0.0039 \ 0.5006 \ 0.0136; 0.0928 \ 0.0136 \ 0.8256]$

$Y=[-0.2565 \ -0.0210 \ -0.1891; -0.0210 \ -0.3447 \ -0.0182; -0.1891 \ -0.0182 \ -0.8688]$

Path Method is applied to the BMI problem

The method lasts 1.0905 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9377 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 17.8922 seconds

The method found a feasible solution given in the following

$X=[0.5881 \ -0.0000 \ 0.4885; -0.0000 \ 1.0000 \ -0.0000; 0.4885 \ -0.0000 \ 0.4206]$

$Y=[-0.5612 \ -0.0055 \ -0.4875; -0.0017 \ -0.6206 \ -0.0052; -0.4760 \ -0.0088 \ -0.4229]$

BMI problem number 9 in this batch has the following matrices (Rs)

$R1=[-0.9334 \ 0.1284 \ -0.0092; 0.1284 \ 0.6762 \ -0.4888; -0.0092 \ -0.4888 \ 0.2836]$

Benders Method is applied to the BMI problem

The method lasts 3.4704 seconds

The method found a feasible solution given in the following

$X=[0.5012 \ 0.0168 \ -0.0112; 0.0168 \ 0.7424 \ -0.1626; -0.0112 \ -0.1626 \ 0.6091]$

$Y=[-0.1644 \ -0.0520 \ 0.0007; -0.0520 \ -0.8068 \ 0.1684; 0.0007 \ 0.1684 \ -0.6723]$

Path Method is applied to the BMI problem

The method lasts 1.0220 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.7828 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 35.2097 seconds

The method found a feasible solution given in the following

$X=[0.6839 \ 0.1842 \ 0.4257; 0.1842 \ 0.8925 \ -0.2479; 0.4257 \ -0.2479 \ 0.4265]$

$Y=[-0.5863 \ -0.0911 \ -0.3979; -0.0974 \ -0.7752 \ 0.2737; -0.3904 \ 0.2793 \ -0.4184]$

BMI problem number 10 in this batch has the following matrices (Rs)

$R1=[-0.4132 \ 0.3087 \ 0.4074; 0.3087 \ -0.7684 \ -0.7310; 0.4074 \ -0.7310 \ -0.7172]$

Benders Method is applied to the BMI problem

The method lasts 0.7998 seconds

The method found a feasible solution given in the following

$X = [0.5000 \ 0.0000 \ 0.0000; 0.0000 \ 0.5000 \ 0.0000; 0.0000 \ 0.0000 \ 0.5000]$

$Y = [-0.5767 \ -0.0968 \ -0.1265; -0.0968 \ -0.4652 \ 0.2268; -0.1265 \ 0.2268 \ -0.4805]$

Path Method is applied to the BMI problem

The method lasts 1.2012 seconds

The method found a feasible solution given in the following

$X = [1.0000 \ 0.0004 \ -0.0003; 0.0004 \ 0.2872 \ 0.4440; -0.0003 \ 0.4440 \ 0.7234]$

$Y = [-0.3956 \ 0.2116 \ 0.3258; 0.0404 \ -0.1767 \ -0.4522; -0.7314 \ 0.1916 \ 0.2482]$

ILMI Method is applied to the BMI problem

The method lasts 0.8044 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 3.3495 seconds

The method found a feasible solution given in the following

$X = [0.6724 \ -0.0737 \ -0.1234; -0.0737 \ 0.9822 \ -0.0612; -0.1234 \ -0.0612 \ 0.0284]$

$Y = [-0.6623 \ 0.1186 \ 0.1183; 0.2149 \ -0.8745 \ 0.0261; 0.1106 \ 0.0443 \ -0.0247]$

From here, 10 BMIs in the batch related to $n=3$ and $r=2$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

$R1=[0.0446 \ -0.2785 \ -0.1785; -0.2785 \ -0.4073 \ -0.2391; -0.1785 \ -0.2391 \ 0.1132]$

$R2=[-0.9031 \ -0.0231 \ 0.4873; -0.0231 \ 0.4409 \ 0.3129; 0.4873 \ 0.3129 \ -0.3701]$

Benders Method is applied to the BMI problem

The method lasts 0.7821 seconds

The method found a feasible solution given in the following

$X=[0.5000 \ 0.0000 \ 0.0000; 0.0000 \ 0.5000 \ 0.0000; 0.0000 \ 0.0000 \ 0.5000]$

$Y=[-0.5679 \ -0.0110 \ -0.0129; -0.0116 \ -0.6920 \ -0.0347; -0.0115 \ -0.0349 \ -0.6157]$

Path Method is applied to the BMI problem

The method lasts 2.8914 seconds

The method found a feasible solution given in the following

$X=[0.4471 \ -0.3241 \ 0.0556; -0.3241 \ 0.8101 \ 0.0326; 0.0556 \ 0.0326 \ 0.9944]$

$Y=[-0.2629 \ 0.3252 \ -0.1031; -0.1161 \ -0.2764 \ -0.6878; 0.0096 \ 0.1978 \ -0.2560]$

ILMI Method is applied to the BMI problem

The method lasts 0.7418 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 259.2523 seconds

The method found a feasible solution given in the following

$X=[0.4168 \ -0.3987 \ 0.1735; -0.3987 \ 0.7170 \ 0.1224; 0.1735 \ 0.1224 \ 0.9470]$

Y=[-0.4582 0.1417 -0.3679;0.2905 -0.7380 -0.4899;-0.0254 0.1374 -0.6352]

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[-0.6500 -0.6614 -0.5206;-0.6614 -0.3242 -0.2223;-0.5206 -0.2223 -0.6859]

R2=[-0.5958 0.0782 0.1104;0.0782 0.0964 -0.7438;0.1104 -0.7438 0.1455]

Benders Method is applied to the BMI problem

The method lasts 2.0601 seconds

The method found a feasible solution given in the following

X=[0.5001 -0.0042 0.0044;-0.0042 0.6699 -0.1762;0.0044 -0.1762 0.6826]

Y=[-0.5742 0.0802 0.1106;0.1218 -0.7221 0.1340;0.0659 0.1954 -0.7446]

Path Method is applied to the BMI problem

The method lasts 3.6488 seconds

The method found a feasible solution given in the following

X=[0.4760 -0.2639 -0.2555;-0.2639 0.7503 -0.2220;-0.2555 -0.2220 0.8009]

Y=[-0.4764 0.0435 0.5203;0.1382 -0.7376 0.3035;0.1346 0.2312 -0.3489]

ILMI Method is applied to the BMI problem

The method lasts 0.7630 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 14.2828 seconds

The method found a feasible solution given in the following

$X = [0.4125 \ 0.1396 \ -0.1191; 0.1396 \ 0.8049 \ -0.2811; -0.1191 \ -0.2811 \ 0.3844]$

$Y = [-0.5144 \ -0.0569 \ 0.2437; 0.1204 \ -0.7064 \ 0.2419; -0.0266 \ 0.0778 \ -0.5022]$

BMI problem number 3 in this batch has the following matrices (Rs)

$R1 = [-0.6265 \ -0.3860 \ 0.8015; -0.3860 \ 0.2597 \ 0.7763; 0.8015 \ 0.7763 \ 0.3228]$

$R2 = [-0.4285 \ 0.2514 \ -0.3124; 0.2514 \ -0.3512 \ -0.0889; -0.3124 \ -0.0889 \ 0.0059]$

Benders Method is applied to the BMI problem

The method lasts 1.8908 seconds

The method found a feasible solution given in the following

$X = [0.5178 \ 0.0465 \ 0.0616; 0.0465 \ 0.6216 \ 0.1610; 0.0616 \ 0.1610 \ 0.7133]$

$Y = [-0.7029 \ -0.0332 \ -0.0385; -0.0329 \ -0.7723 \ -0.1046; -0.0388 \ -0.1045 \ -0.8333]$

Path Method is applied to the BMI problem

The method lasts 0.7741 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.6777 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 37.6173 seconds

The method found a feasible solution given in the following

$X = [0.9176 \ 0.1584 \ 0.0000; 0.1584 \ 0.6954 \ -0.0000; 0.0000 \ -0.0000 \ 1.0000]$

$Y = [-0.7266 \ -0.0908 \ -0.0375; 0.0160 \ -0.7649 \ -0.0027; -0.0099 \ -0.1432 \ -0.8574]$

BMI problem number 4 in this batch has the following matrices (Rs)

$R1 = [-0.8085 \ -0.7286 \ 0.7185; -0.7286 \ -0.9239 \ 0.0744; 0.7185 \ 0.0744 \ -0.8159]$

$R2 = [0.6323 \ -0.1625 \ 0.2791; -0.1625 \ -0.7518 \ -0.7948; 0.2791 \ -0.7948 \ -0.8715]$

Benders Method is applied to the BMI problem

The method lasts 1.7849 seconds

The method found a feasible solution given in the following

$X = [0.8038 \ -0.0807 \ 0.0913; -0.0807 \ 0.5214 \ -0.0243; 0.0913 \ -0.0243 \ 0.5274]$

$Y = [-0.8921 \ 0.0425 \ -0.0665; 0.0427 \ -0.5812 \ 0.1604; -0.0664 \ 0.1608 \ -0.5604]$

Path Method is applied to the BMI problem

The method lasts 0.7408 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.6499 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 5.2624 seconds

The method found a feasible solution given in the following

$X = [0.9734 \ 0.0904 \ 0.0084; -0.0904 \ 0.6921 \ -0.0359; -0.0084 \ -0.0359 \ 0.0020]$

$Y = [-0.8842 \ 0.1830 \ 0.0019; 0.0360 \ -0.7782 \ 0.0411; 0.0101 \ 0.0393 \ -0.0022]$

BMI problem number 5 in this batch has the following matrices (Rs)

$R1 = [-0.7737 \ 0.0891 \ -0.3773; 0.0891 \ 0.0242 \ 0.0481; -0.3773 \ 0.0481 \ -0.5455]$

$R2 = [0.3764 \ 0.2576 \ 0.4594; 0.2576 \ 0.5818 \ -0.3693; 0.4594 \ -0.3693 \ -0.9356]$

Benders Method is applied to the BMI problem

The method lasts 1.7871 seconds

The method found a feasible solution given in the following

$X = [0.5958 \ 0.1566 \ -0.0082; 0.1566 \ 0.7562 \ -0.0134; -0.0082 \ -0.0134 \ 0.5007]$

$Y = [-0.7113 \ -0.0523 \ -0.0543; -0.0589 \ -0.7679 \ 0.0478; -0.0623 \ 0.0342 \ -0.5385]$

Path Method is applied to the BMI problem

The method lasts 1.0962 seconds

The method found a feasible solution given in the following

$X=[0.9977 \ 0.0190 \ 0.0329; 0.0190 \ 0.8457 \ -0.2672; 0.0329 \ -0.2672 \ 0.5373]$

$Y=[-0.6125 \ -0.4239 \ -0.2940; 0.5447 \ -0.5647 \ 0.0080; 0.5155 \ 0.3539 \ -0.5046]$

ILMI Method is applied to the BMI problem

The method lasts 0.7414 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 57.2780 seconds

The method found a feasible solution given in the following

$X=[0.7684 \ 0.0000 \ 0.4099; 0.0000 \ 0.8060 \ 0.0000; 0.4099 \ 0.0000 \ 0.2744]$

$Y=[-0.5584 \ -0.0378 \ -0.1388; -0.0509 \ -0.8311 \ -0.0256; -0.4322 \ -0.0715 \ -0.4025]$

BMI problem number 6 in this batch has the following matrices (Rs)

$R1=[-0.4439 \ 0.2342 \ 0.5771; 0.2342 \ 0.4872 \ 0.0281; 0.5771 \ 0.0281 \ 0.6684]$

$R2=[-0.0787 \ 0.1294 \ 0.0349; 0.1294 \ -1.0731 \ -0.1385; 0.0349 \ -0.1385 \ 0.7524]$

Benders Method is applied to the BMI problem

The method lasts 1.8002 seconds

The method found a feasible solution given in the following

$X=[0.5586 \ 0.0376 \ 0.1257; 0.0376 \ 0.5242 \ 0.0808; 0.1257 \ 0.0808 \ 0.7699]$

Y=[-0.6047 -0.0333 -0.0867;-0.0161 -0.7168 -0.0327;-0.0337 -0.0354 -0.8220]

Path Method is applied to the BMI problem

The method lasts 2.5427 seconds

The method found a feasible solution given in the following

X=[0.2831 0.3197 0.0836;0.3197 0.8534 -0.0539;0.0836 -0.0539 0.9218]

Y=[-0.4243 -0.4488 0.3221;-0.1893 -0.2798 0.0276;-0.2173 -0.0328 -0.7516]

ILMI Method is applied to the BMI problem

The method lasts 0.6637 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 13.7254 seconds

The method found a feasible solution given in the following

X=[0.4081 0.2589 0.0521;0.2589 0.8854 -0.0000;0.0521 -0.0000 0.6163]

Y=[-0.5523 -0.0447 -0.0050;-0.2438 -0.6672 0.0287;-0.0822 0.0167 -0.7786]

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[-0.7633 0.3618 -0.4367;0.3618 -0.5797 -0.5177;-0.4367 -0.5177 -0.5480]

R2=[0.5635 -0.5401 0.7576;-0.5401 0.3604 -0.6155;0.7576 -0.6155 -0.5732]

Benders Method is applied to the BMI problem

The method lasts 1.7562 seconds

The method found a feasible solution given in the following

$X = [0.6711 \ -0.1411 \ 0.1056; -0.1411 \ 0.6163 \ -0.0871; 0.1056 \ -0.0871 \ 0.5652]$

$Y = [-0.7456 \ 0.1440 \ -0.0958; 0.1448 \ -0.5934 \ 0.2062; -0.0947 \ 0.2075 \ -0.4927]$

Path Method is applied to the BMI problem

The method lasts 2.5509 seconds

The method found a feasible solution given in the following

$X = [0.7029 \ -0.4329 \ -0.1085; -0.4329 \ 0.3588 \ -0.1788; -0.1085 \ -0.1788 \ 0.9192]$

$Y = [-0.7286 \ 0.5303 \ -0.2374; -0.1488 \ 0.0074 \ 0.6513; 0.0768 \ 0.1451 \ -0.3266]$

ILMI Method is applied to the BMI problem

The method lasts 0.6751 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 193.1694 seconds

The method found a feasible solution given in the following

$X = [0.9214 \ -0.2100 \ -0.0727; -0.2100 \ 0.4389 \ -0.1944; -0.0727 \ -0.1944 \ 0.9327]$

$Y = [-0.8520 \ 0.2325 \ -0.1326; 0.0547 \ -0.5570 \ 0.0233; 0.0235 \ 0.2575 \ -0.7118]$

BMI problem number 8 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.2227 & -0.0444 & 0.0158 \\ -0.0444 & 0.5360 & -0.0770 \\ 0.0158 & -0.0770 & -0.3291 \end{bmatrix}$

$R2 = \begin{bmatrix} 0.4447 & -0.2342 & 0.1322 \\ -0.2342 & -0.8482 & -0.1273 \\ 0.1322 & -0.1273 & -1.1966 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 1.3557 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.5000 & 0.0000 & 0.0000 \\ 0.0000 & 0.5000 & 0.0000 \\ 0.0000 & 0.0000 & 0.5000 \end{bmatrix}$

$Y = \begin{bmatrix} -0.6943 & -0.0015 & -0.0258 \\ -0.0015 & -0.7046 & 0.0291 \\ -0.0258 & 0.0291 & -0.3638 \end{bmatrix}$

Path Method is applied to the BMI problem

The method lasts 1.2345 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.8036 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 3.3658 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.7187 & -0.0207 & 0.0016 \\ -0.0207 & 0.8845 & 0.3178 \\ 0.0016 & 0.3178 & 0.1143 \end{bmatrix}$

$Y = \begin{bmatrix} -0.7091 & 0.0215 & -0.0012 \\ 0.0263 & -0.8841 & -0.3176 \\ 0.0005 & -0.3176 & -0.1142 \end{bmatrix}$

BMI problem number 9 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.2420 & 0.2411 & -0.0644 \\ 0.2411 & -0.1034 & 0.1102 \\ -0.0644 & 0.1102 & -0.2218 \end{bmatrix}$

$R2 = \begin{bmatrix} -0.7049 & -0.2742 & 0.0804 \\ -0.2742 & -0.8174 & 0.5521 \\ 0.0804 & 0.5521 & -0.3831 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 0.7525 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.5000 & 0.0000 & 0.0000 \\ 0.0000 & 0.5000 & 0.0000 \\ 0.0000 & 0.0000 & 0.5000 \end{bmatrix}$

$Y = \begin{bmatrix} -0.6158 & -0.0742 & 0.0519 \\ -0.0742 & -0.6454 & -0.0488 \\ 0.0519 & -0.0488 & -0.6463 \end{bmatrix}$

Path Method is applied to the BMI problem

The method lasts 1.1235 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.8405 & 0.2656 & -0.1533 \\ 0.2656 & 0.5561 & 0.2559 \\ -0.1533 & 0.2559 & 0.8524 \end{bmatrix}$

$Y = \begin{bmatrix} -0.6221 & -0.4156 & -0.4086 \\ 0.1789 & -0.5933 & -0.3289 \\ -0.1967 & -0.0265 & -0.3478 \end{bmatrix}$

ILMI Method is applied to the BMI problem

The method lasts 0.6770 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 5.1949 seconds

The method found a feasible solution given in the following

$X = [0.9395 \ 0.1785 \ -0.0492; 0.1785 \ 0.1597 \ -0.2497; -0.0492 \ -0.2497 \ 0.4619]$

$Y = [-0.9355 \ -0.1034 \ -0.0933; -0.1962 \ -0.1743 \ 0.2726; 0.0840 \ 0.3010 \ -0.5499]$

BMI problem number 10 in this batch has the following matrices (Rs)

$R1 = [0.3770 \ -0.6617 \ -0.8474; -0.6617 \ 0.1731 \ -0.1850; -0.8474 \ -0.1850 \ 0.4623]$

$R2 = [-0.2904 \ -0.2984 \ 0.0359; -0.2984 \ 0.1738 \ -0.2346; 0.0359 \ -0.2346 \ 0.6896]$

Benders Method is applied to the BMI problem

The method lasts 2.0782 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.2673 seconds

The method found a feasible solution given in the following

$X = [0.6187 \ -0.3208 \ -0.1960; -0.3208 \ 0.7301 \ -0.1649; -0.1960 \ -0.1649 \ 0.8992]$

$Y = [-0.5733 \ 0.1298 \ 0.4917; 0.3627 \ -0.5186 \ 0.0768; 0.0974 \ -0.1392 \ -0.6416]$

ILMI Method is applied to the BMI problem

The method lasts 0.6896 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 338.7351 seconds

The method found a feasible solution given in the following

$X = [0.6250 \ 0.3994 \ 0.0042; -0.3994 \ 0.3304 \ 0.0585; 0.0042 \ 0.0585 \ 0.9880]$

$Y = [-0.5668 \ 0.3951 \ 0.0899; 0.3851 \ -0.3163 \ -0.0728; 0.0533 \ 0.0220 \ -0.8844]$

From here, 10 BMIs in the batch related to $n=3$ and $r=3$ are presented

BMI problem number 1 in this batch has the following matrices (R_s)

$R1 = [-0.7913 \ 0.5607 \ 0.2098; 0.5607 \ -0.7466 \ -0.5355; 0.2098 \ -0.5355 \ -0.3874]$

$R2 = [-0.8913 \ -0.4351 \ 0.1334; -0.4351 \ -0.2360 \ 0.3113; 0.1334 \ 0.3113 \ -0.8268]$

$R3 = [-0.4007 \ 0.4407 \ 0.3575; 0.4407 \ 0.2542 \ -0.1921; 0.3575 \ -0.1921 \ -0.9187]$

Benders Method is applied to the BMI problem

The method lasts 0.7890 seconds

The method found a feasible solution given in the following

$X = [0.5000 \ 0.0000 \ 0.0000; 0.0000 \ 0.5000 \ 0.0000; 0.0000 \ 0.0000 \ 0.5000]$

$Y = [-0.5882 \ -0.0596 \ -0.0278; -0.0596 \ -0.6772 \ 0.0155; -0.0271 \ 0.0152 \ -0.5392]$

Path Method is applied to the BMI problem

The method lasts 1.8138 seconds

The method found a feasible solution given in the following

$X = [0.9113 \ 0.0137 \ -0.0634; 0.0137 \ 0.6172 \ -0.4504; -0.0634 \ -0.4504 \ 0.3982]$

$Y = [-0.7271 \ 0.0355 \ -0.0204; 0.2785 \ -0.0429 \ -0.2278; 0.2971 \ 0.5423 \ -0.3768]$

ILMI Method is applied to the BMI problem

The method lasts 0.7537 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 5.4068 seconds

The method found a feasible solution given in the following

$X = [0.4533 \ 0.4596 \ 0.1412; 0.4596 \ 0.5951 \ -0.0000; 0.1412 \ -0.0000 \ 0.2043]$

$Y = [-0.3853 \ -0.4558 \ -0.0481; -0.3164 \ -0.5718 \ 0.1775; -0.2043 \ -0.0228 \ -0.2665]$

BMI problem number 2 in this batch has the following matrices (Rs)

$R1 = [-0.9653 \ -0.2369 \ -0.1719; -0.2369 \ -0.3705 \ 0.5760; -0.1719 \ 0.5760 \ -0.8795]$

$R2 = [-0.2806 \ 0.2952 \ 0.2653; 0.2952 \ -0.9354 \ 0.0372; 0.2653 \ 0.0372 \ -0.3460]$

$R3 = [0.2278 \ -0.8228 \ -0.2985; -0.8228 \ -0.1573 \ -0.0556; -0.2985 \ -0.0556 \ -0.5754]$

Benders Method is applied to the BMI problem

The method lasts 1.8274 seconds

The method found a feasible solution given in the following

$X = [0.7186 \ -0.1670 \ -0.0377; -0.1670 \ 0.6275 \ 0.0288; -0.0377 \ 0.0288 \ 0.5065]$

$Y = [-0.8083 \ 0.1558 \ -0.0227; 0.1554 \ -0.6972 \ -0.1001; -0.0209 \ -0.0977 \ -0.6122]$

Path Method is applied to the BMI problem

The method lasts 0.8391 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.6906 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 7.1088 seconds

The method found a feasible solution given in the following

$X = [0.9520 \ 0.2137 \ 0.0029; -0.2137 \ 0.0483 \ 0.0000; 0.0029 \ 0.0000 \ 0.0015]$

$Y = [-0.9275 \ 0.2120 \ 0.0055; 0.2104 \ -0.0482 \ -0.0015; 0.0020 \ -0.0008 \ -0.0006]$

BMI problem number 3 in this batch has the following matrices (Rs)

$R1 = [0.2817 \ 0.3570 \ 0.2485; 0.3570 \ -0.8940 \ 0.2269; 0.2485 \ 0.2269 \ -0.5701]$

$R2 = [-0.1297 \ -0.5793 \ 0.3335; -0.5793 \ -0.6097 \ -0.5817; 0.3335 \ -0.5817 \ -0.8891]$

$R3 = [0.0881 \ -0.0357 \ -0.0850; -0.0357 \ -0.1715 \ -0.4729; -0.0850 \ -0.4729 \ 0.5152]$

Benders Method is applied to the BMI problem

The method lasts 1.8368 seconds

The method found a feasible solution given in the following

X=[0.5028 0.0140 -0.0278;0.0140 0.5707 -0.1405;-0.0278 -0.1405 0.7792]

Y=[-0.6949 -0.0320 -0.0023;-0.0089 -0.7164 0.0612;-0.0318 0.1142 -0.7620]

Path Method is applied to the BMI problem

The method lasts 0.8164 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.7161 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 22.5200 seconds

The method found a feasible solution given in the following

X=[0.3638 0.1414 -0.0486;0.1414 0.5304 -0.3129;-0.0486 -0.3129 0.7571]

Y=[-0.5728 -0.2332 0.0749;-0.0374 -0.6136 0.0676;-0.1115 0.2912 -0.6732]

BMI problem number 4 in this batch has the following matrices (Rs)

R1=[0.2730 0.0826 0.1399;0.0826 0.6975 -0.0812;0.1399 -0.0812 -0.5381]

R2=[-0.5544 -0.2321 0.3881;-0.2321 -0.0500 -0.5699;0.3881 -0.5699 0.1794]

R3=[0.7341 -0.4388 0.0374;-0.4388 0.5628 -0.4859;0.0374 -0.4859 0.3808]

Benders Method is applied to the BMI problem

The method lasts 3.9687 seconds

The method found a feasible solution given in the following

$X=[0.6313 \ -0.1462 \ 0.0876;-0.1462 \ 0.6629 \ -0.0976;0.0876 \ -0.0976 \ 0.5585]$

$Y=[-0.7670 \ 0.1233 \ -0.0472;0.0243 \ -0.7877 \ 0.0244;-0.0447 \ 0.0779 \ -0.7122]$

Path Method is applied to the BMI problem

The method lasts 3.9786 seconds

The method found a feasible solution given in the following

$X=[0.9684 \ 0.0009 \ 0.0557;0.0009 \ 0.8655 \ -0.2213;0.0557 \ -0.2213 \ 0.5427]$

$Y=[-0.6741 \ -0.1292 \ 0.2742;-0.0065 \ -0.7743 \ 0.2150;-0.2479 \ 0.1731 \ -0.6004]$

ILMI Method is applied to the BMI problem

The method lasts 0.7176 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 280.1857 seconds

The method found a feasible solution given in the following

$X=[1.0000 \ 0.0000 \ -0.0000;0.0000 \ 0.6408 \ -0.4121;-0.0000 \ -0.4121 \ 0.5271]$

$Y=[-0.9211 \ -0.0495 \ 0.0075;0.0491 \ -0.5633 \ 0.0043;-0.0017 \ 0.5458 \ -0.6838]$

BMI problem number 5 in this batch has the following matrices (Rs)

$R1 = [0.1228 \ 0.2648 \ -0.6886; 0.2648 \ -0.6345 \ 0.2072; -0.6886 \ 0.2072 \ 0.3357]$

$R2 = [-0.8568 \ 0.1250 \ 0.6101; 0.1250 \ 0.6945 \ -0.3020; 0.6101 \ -0.3020 \ 0.7926]$

$R3 = [-0.1599 \ 0.1893 \ -0.2105; 0.1893 \ 0.1812 \ 0.4151; -0.2105 \ 0.4151 \ 0.4903]$

Benders Method is applied to the BMI problem

The method lasts 2.1946 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.4671 seconds

The method found a feasible solution given in the following

$X = [0.5813 \ -0.2880 \ -0.1032; -0.2880 \ 0.8019 \ -0.0710; -0.1032 \ -0.0710 \ 0.9746]$

$Y = [-0.4763 \ 0.0479 \ 0.6075; 0.0935 \ -0.6226 \ 0.3463; -0.0744 \ -0.2603 \ -0.6277]$

ILMI Method is applied to the BMI problem

The method lasts 0.7053 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 432.8669 seconds

The method found a feasible solution given in the following

$X = [0.8573 \ 0.1917 \ 0.0000; 0.1917 \ 0.7424 \ 0.0000; 0.0000 \ 0.0000 \ 1.0000]$

$Y = [-0.7895 \ -0.1204 \ 0.0599; -0.0003 \ -0.8043 \ -0.0526; -0.0154 \ 0.1053 \ -0.9480]$

BMI problem number 6 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} 0.0850 & -0.7142 & -0.5656 \\ -0.7142 & -0.6578 & 0.5778 \\ -0.5656 & 0.5778 & -0.7422 \end{bmatrix}$

$R2 = \begin{bmatrix} -0.1378 & 0.3289 & 0.1099 \\ 0.3289 & -0.9785 & -0.1952 \\ 0.1099 & -0.1952 & -0.0713 \end{bmatrix}$

$R3 = \begin{bmatrix} -0.1910 & 0.6722 & 0.3984 \\ 0.6722 & 0.4355 & 0.0924 \\ 0.3984 & 0.0924 & -0.7281 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 2.8584 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.8115 & 0.0318 & -0.0780 \\ 0.0318 & 0.8095 & 0.1219 \\ -0.0780 & 0.1219 & 0.5746 \end{bmatrix}$

$Y = \begin{bmatrix} -0.8969 & -0.0161 & 0.0574 \\ -0.0290 & -0.8925 & -0.0831 \\ 0.0499 & -0.0826 & -0.7319 \end{bmatrix}$

Path Method is applied to the BMI problem

The method lasts 0.7870 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.7257 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 87.2234 seconds

The method found a feasible solution given in the following

X=[1.0000 -0.0000 -0.0000;-0.0000 0.7714 0.4199;-0.0000 0.4199 0.2286]

Y=[-0.7988 0.0194 0.0113;0.0253 -0.7661 -0.4175;0.0139 -0.4176 -0.2276]

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[0.6440 -0.1244 -0.4958;-0.1244 -0.7990 -0.4525;-0.4958 -0.4525 -0.5045]

R2=[-0.5271 -0.0231 -0.0352;-0.0231 0.0032 0.0784;-0.0352 0.0784 -0.5278]

R3=[-1.0301 0.2015 -0.4855;0.2015 0.4660 0.1024;-0.4855 0.1024 -0.7017]

Benders Method is applied to the BMI problem

The method lasts 1.8887 seconds

The method found a feasible solution given in the following

X=[0.8076 0.0091 -0.1174;0.0091 0.5003 -0.0035;-0.1174 -0.0035 0.5448]

Y=[-0.7888 -0.0328 0.1017;0.0041 -0.7049 -0.0202;0.0853 -0.0050 -0.5632]

Path Method is applied to the BMI problem

The method lasts 1.8956 seconds

The method found a feasible solution given in the following

X=[0.8560 -0.1208 -0.2509;-0.1208 0.8827 -0.2003;-0.2509 -0.2003 0.5563]

Y=[-0.4210 0.0687 0.6851;-0.0482 -0.3641 0.2165;0.2404 0.1289 -0.0518]

ILMI Method is applied to the BMI problem

The method lasts 1.5447 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 37.5199 seconds

The method found a feasible solution given in the following

$X = [0.8984 \ -0.0000 \ -0.2040; -0.0000 \ 1.0000 \ -0.0000; -0.2040 \ -0.0000 \ 0.5901]$

$Y = [-0.9175 \ -0.0036 \ 0.0291; 0.0048 \ -0.9270 \ 0.0606; 0.2335 \ -0.0553 \ -0.7517]$

BMI problem number 8 in this batch has the following matrices (Rs)

$R1 = [-1.1572 \ 0.4826 \ -0.6559; 0.4826 \ -1.1761 \ -0.6020; -0.6559 \ -0.6020 \ 0.5875]$

$R2 = [-0.8209 \ 0.7308 \ -0.0784; 0.7308 \ 0.3848 \ 0.7534; -0.0784 \ 0.7534 \ -0.0660]$

$R3 = [-0.9950 \ 0.6902 \ 0.3084; 0.6902 \ 0.6021 \ 0.3040; 0.3084 \ 0.3040 \ -0.7874]$

Benders Method is applied to the BMI problem

The method lasts 2.9068 seconds

The method found a feasible solution given in the following

$X = [0.5715 \ 0.1262 \ -0.0515; 0.1262 \ 0.7807 \ 0.0434; -0.0515 \ 0.0434 \ 0.8492]$

$Y = [-0.4640 \ -0.2147 \ 0.0944; -0.2188 \ -0.8116 \ -0.0466; 0.0860 \ -0.0635 \ -0.9063]$

Path Method is applied to the BMI problem

The method lasts 1.8853 seconds

The method found a feasible solution given in the following

$X=[0.4408 \ 0.4438 \ 0.1604;0.4438 \ 0.6478 \ -0.1273;0.1604 \ -0.1273 \ 0.9540]$

$Y=[-0.3597 \ -0.6868 \ 0.0406;-0.5433 \ -0.2915 \ -0.5157;0.1242 \ 0.2963 \ -0.8015]$

ILMI Method is applied to the BMI problem

The method lasts 0.7271 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 5.4212 seconds

The method found a feasible solution given in the following

$X=[0.3478 \ 0.4721 \ 0.0411;0.4721 \ 0.6479 \ -0.0161;0.0411 \ -0.0161 \ 0.9795]$

$Y=[-0.3410 \ -0.4621 \ -0.0570;-0.4636 \ -0.6329 \ -0.0084;-0.0531 \ -0.0059 \ -0.9442]$

BMI problem number 9 in this batch has the following matrices (Rs)

$R1=[0.7583 \ 0.5361 \ -0.1236;0.5361 \ -0.7107 \ -0.4160;-0.1236 \ -0.4160 \ 0.5731]$

$R2=[-0.4689 \ 0.4296 \ 0.0816;0.4296 \ -0.1761 \ -0.4521;0.0816 \ -0.4521 \ -0.3554]$

$R3=[-0.6882 \ -0.3704 \ -0.5927;-0.3704 \ -0.7622 \ 0.5997;-0.5927 \ 0.5997 \ 0.3650]$

Benders Method is applied to the BMI problem

The method lasts 1.8422 seconds

The method found a feasible solution given in the following

$X=[0.7234 \ 0.0993 \ -0.1379;0.0993 \ 0.5441 \ -0.0613;-0.1379 \ -0.0613 \ 0.5851]$

Y=[-0.7828 0.0224 0.1342;-0.0907 -0.6488 0.0588;0.0328 -0.0394 -0.7289]

Path Method is applied to the BMI problem

The method lasts 0.7456 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.7062 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 686.1710 seconds

The method found a feasible solution given in the following

X=[0.9874 0.0000 -0.0000;0.0000 0.9746 -0.0976;-0.0000 -0.0976 0.6250]

Y=[-0.8422 0.0801 0.0802;-0.0016 -0.9354 0.0169;-0.0174 0.0984 -0.7735]

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[-0.2544 -0.2581 -0.1100;-0.2581 -0.5447 -0.4716;-0.1100 -0.4716 -0.4145]

R2=[0.6646 0.2033 -0.4271;0.2033 -0.2647 -0.2966;-0.4271 -0.2966 0.5513]

R3=[0.7766 0.3696 -0.7336;0.3696 -0.0289 -0.0142;-0.7336 -0.0142 0.4796]

Benders Method is applied to the BMI problem

The method lasts 1.8549 seconds

The method found a feasible solution given in the following

$X=[0.7124 \ 0.0551 \ -0.1635; 0.0551 \ 0.5143 \ -0.0425; -0.1635 \ -0.0425 \ 0.6259]$

$Y=[-0.7932 \ -0.0576 \ 0.1496; -0.0587 \ -0.5268 \ 0.0575; 0.1493 \ 0.0588 \ -0.7096]$

Path Method is applied to the BMI problem

The method lasts 0.7861 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.6791 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 52.0470 seconds

The method found a feasible solution given in the following

$X=[0.8851 \ -0.0000 \ -0.2528; -0.0000 \ 0.6681 \ 0.0000; -0.2528 \ 0.0000 \ 0.4442]$

$Y=[-0.9114 \ -0.0660 \ 0.2915; 0.0638 \ -0.6143 \ 0.0617; -0.0370 \ 0.0039 \ -0.5845]$

From here, 10 BMIs in the batch related to $n=3$ and $r=4$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

$R1=[0.1935 \ -0.2910 \ -0.0598; -0.2910 \ -0.2578 \ 0.1894; -0.0598 \ 0.1894 \ 0.1587]$

R2=[-0.1707 0.2865 0.1099;0.2865 0.4441 0.2176;0.1099 0.2176 0.3452]

R3=[-0.2908 -0.3079 0.1020;-0.3079 -0.9689 -0.3687;0.1020 -0.3687 -0.3787]

R4=[-0.5195 0.3982 0.6919;0.3982 0.7586 -0.4377;0.6919 -0.4377 -0.6353]

Benders Method is applied to the BMI problem

The method lasts 1.9956 seconds

The method found a feasible solution given in the following

X=[0.5106 0.0591 -0.0119;0.0591 0.8286 -0.0663;-0.0119 -0.0663 0.5134]

Y=[-0.6830 -0.0149 -0.0173;-0.0432 -0.8398 -0.0524;0.0129 0.0775 -0.6925]

Path Method is applied to the BMI problem

The method lasts 0.9015 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.7288 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 15.2267 seconds

The method found a feasible solution given in the following

X=[0.4186 0.0808 -0.2185;0.0808 0.9577 -0.0662;-0.2185 -0.0662 0.6178]

Y=[-0.5886 0.1606 0.2060;-0.1295 -0.8557 -0.0761;0.0646 0.0755 -0.6937]

BMI problem number 2 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.0616 & 0.0204 & 0.4072 \\ 0.0204 & -0.9400 & 0.6328 \\ 0.4072 & 0.6328 & -0.0875 \end{bmatrix}$

$R2 = \begin{bmatrix} 0.1404 & 0.1370 & 0.2950 \\ 0.1370 & -0.5547 & -0.9133 \\ 0.2950 & -0.9133 & -0.3691 \end{bmatrix}$

$R3 = \begin{bmatrix} -0.5488 & -0.5831 & 0.0656 \\ -0.5831 & -0.5518 & 0.0248 \\ 0.0656 & 0.0248 & -0.1497 \end{bmatrix}$

$R4 = \begin{bmatrix} -1.0183 & -0.2196 & 0.0500 \\ -0.2196 & -0.4934 & -0.3227 \\ 0.0500 & -0.3227 & -0.2427 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 0.8060 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.5000 & 0.0000 & 0.0000 \\ 0.0000 & 0.5000 & 0.0000 \\ 0.0000 & 0.0000 & 0.5000 \end{bmatrix}$

$Y = \begin{bmatrix} -0.6225 & -0.0163 & -0.0559 \\ -0.0163 & -0.7031 & 0.0114 \\ -0.0559 & 0.0114 & -0.6696 \end{bmatrix}$

Path Method is applied to the BMI problem

The method lasts 0.7736 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.6944 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 35.8907 seconds

The method found a feasible solution given in the following

X=[0.6737 0.3809 0.2471;0.3809 0.2596 -0.0000;0.2471 -0.0000 0.5318]

Y=[-0.6835 -0.4065 -0.1872;-0.3950 -0.2988 0.0935;-0.2234 0.0688 -0.6981]

BMI problem number 3 in this batch has the following matrices (Rs)

R1=[-0.0269 0.3684 -0.3330;0.3684 -0.3347 -0.3984;-0.3330 -0.3984 -0.7634]

R2=[-0.0498 0.0824 0.2983;0.0824 -0.7794 -0.5452;0.2983 -0.5452 -0.0620]

R3=[-0.8932 0.5485 0.6266;0.5485 -0.5917 0.2573;0.6266 0.2573 0.1140]

R4=[0.4944 -0.8420 0.4879;-0.8420 -0.3173 -0.5400;0.4879 -0.5400 -0.3782]

Benders Method is applied to the BMI problem

The method lasts 1.8925 seconds

The method found a feasible solution given in the following

X=[0.7048 -0.1398 0.1036;-0.1398 0.5955 -0.0707;0.1036 -0.0707 0.5524]

Y=[-0.8177 0.0402 -0.1027;0.1474 -0.7648 0.0927;-0.0235 -0.0181 -0.7220]

Path Method is applied to the BMI problem

The method lasts 1.8666 seconds

The method found a feasible solution given in the following

X=[0.8496 -0.1162 0.0625;-0.1162 0.9101 0.0483;0.0625 0.0483 0.9741]

Y=[-0.7451 0.2181 0.4980;0.1106 -0.8764 0.3381;-0.4917 -0.1936 -0.6004]

ILMI Method is applied to the BMI problem

The method lasts 0.7205 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 58.0103 seconds

The method found a feasible solution given in the following

$X = [0.8601 \ 0.3077 \ 0.0000; -0.3077 \ 0.3231 \ 0.0000; -0.0000 \ 0.0000 \ 0.8780]$

$Y = [-0.7465 \ 0.0390 \ 0.1289; 0.4197 \ 0.5261 \ 0.2018; 0.0771 \ 0.0907 \ 0.8729]$

BMI problem number 4 in this batch has the following matrices (Rs)

$R1 = [0.0835 \ 0.5090 \ 0.2979; 0.5090 \ 1.0674 \ 0.0493; -0.2979 \ 0.0493 \ 0.3959]$

$R2 = [0.0242 \ 0.1748 \ 0.4182; -0.1748 \ 0.6498 \ 0.5054; 0.4182 \ 0.5054 \ 0.8992]$

$R3 = [0.0582 \ 0.4560 \ 0.3903; -0.4560 \ 0.7869 \ 0.2201; 0.3903 \ 0.2201 \ 0.5275]$

$R4 = [-0.9683 \ 0.0096 \ 0.4873; -0.0096 \ 0.2011 \ 0.1223; 0.4873 \ 0.1223 \ 0.7177]$

Benders Method is applied to the BMI problem

The method lasts 2.9520 seconds

The method found a feasible solution given in the following

$X = [0.5924 \ 0.1390 \ 0.0811; -0.1390 \ 0.8179 \ 0.0412; 0.0811 \ 0.0412 \ 0.8163]$

$Y = [-0.7516 \ 0.0498 \ 0.0476; 0.0845 \ 0.8524 \ 0.0266; -0.0320 \ 0.0027 \ 0.8578]$

Path Method is applied to the BMI problem

The method lasts 0.7706 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.7218 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 184.5770 seconds

The method found a feasible solution given in the following

$X = [1.0000 \ 0.0000 \ -0.0000; 0.0000 \ 1.0000 \ 0.0000; -0.0000 \ 0.0000 \ 1.0000]$

$Y = [-0.9327 \ 0.0321 \ -0.0156; 0.0321 \ -0.9847 \ -0.0075; -0.0156 \ -0.0075 \ -0.9934]$

BMI problem number 5 in this batch has the following matrices (Rs)

$R1 = [-0.0941 \ -0.0560 \ -0.6659; -0.0560 \ -0.9449 \ -0.5247; -0.6659 \ -0.5247 \ -0.9806]$

$R2 = [-0.4562 \ -0.5170 \ -0.8699; -0.5170 \ 0.0655 \ 0.7469; -0.8699 \ 0.7469 \ 0.4347]$

$R3 = [-0.8549 \ -0.0204 \ 0.1489; -0.0204 \ 0.7257 \ -0.0478; 0.1489 \ -0.0478 \ -0.1395]$

$R4 = [-0.4503 \ -0.6042 \ 0.4236; -0.6042 \ 0.1961 \ -0.2379; 0.4236 \ -0.2379 \ -0.8622]$

Benders Method is applied to the BMI problem

The method lasts 1.8565 seconds

The method found a feasible solution given in the following

$X=[0.5722 \ -0.0841 \ -0.1148;-0.0841 \ 0.5979 \ 0.1337;-0.1148 \ 0.1337 \ 0.6825]$

$Y=[-0.6678 \ 0.0743 \ 0.1063;0.0771 \ -0.7498 \ -0.0786;0.1043 \ -0.0804 \ -0.7989]$

Path Method is applied to the BMI problem

The method lasts 3.4244 seconds

The method found a feasible solution given in the following

$X=[0.4322 \ -0.2316 \ -0.3817;-0.2316 \ 0.9056 \ -0.1557;-0.3817 \ -0.1557 \ 0.7434]$

$Y=[-0.4883 \ 0.1725 \ 0.3569;0.0362 \ -0.6944 \ 0.1443;0.3927 \ -0.4295 \ -0.4138]$

ILMI Method is applied to the BMI problem

The method lasts 0.6939 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 14.8781 seconds

The method found a feasible solution given in the following

$X=[0.4956 \ 0.0000 \ -0.3132;0.0000 \ 0.9234 \ -0.0000;-0.3132 \ -0.0000 \ 0.8055]$

$Y=[-0.6294 \ -0.1632 \ 0.2085;0.1288 \ -0.8960 \ 0.1012;0.1776 \ -0.1630 \ -0.8240]$

BMI problem number 6 in this batch has the following matrices (Rs)

$R1=[-0.4045 \ -0.1701 \ -0.1358;-0.1701 \ -0.0255 \ 0.1400;-0.1358 \ 0.1400 \ 0.2992]$

$R2=[-0.1226 \ 0.0699 \ -0.0211;0.0699 \ -0.2964 \ 0.4467;-0.0211 \ 0.4467 \ -0.6851]$

R3=[-0.6308 -0.3982 0.3030;-0.3982 -0.2801 0.8636;0.3030 0.8636 0.1799]

R4=[-0.5358 -0.7245 -0.5847;-0.7245 -0.0066 0.2070;-0.5847 0.2070 0.0852]

Benders Method is applied to the BMI problem

The method lasts 1.8694 seconds

The method found a feasible solution given in the following

X=[0.6080 -0.1171 -0.1127;-0.1171 0.6271 0.1222;-0.1127 0.1222 0.6176]

Y=[-0.7017 0.1227 0.1304;0.0058 -0.6950 -0.1371;-0.0156 -0.0843 -0.7367]

Path Method is applied to the BMI problem

The method lasts 0.8127 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.6771 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 3.6925 seconds

The method found a feasible solution given in the following

X=[0.0833 -0.1867 -0.2031;-0.1867 0.7099 0.2152;-0.2031 0.2152 0.6939]

Y=[-0.0785 0.1962 0.1759;0.1439 -0.7766 0.0213;0.2173 -0.2011 -0.7697]

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[0.1672 -0.1277 0.2877;-0.1277 0.0110 -0.1462;0.2877 -0.1462 0.2896]

R2=[-0.7639 -0.3915 -0.0026;-0.3915 0.6396 0.4544;-0.0026 0.4544 -0.1191]

R3=[0.0032 0.5930 0.0809;0.5930 -0.4337 -0.7309;0.0809 -0.7309 -0.7586]

R4=[-0.9958 0.1020 0.0995;0.1020 0.4380 0.1400;0.0995 0.1400 -0.7080]

Benders Method is applied to the BMI problem

The method lasts 1.8822 seconds

The method found a feasible solution given in the following

X=[0.5153 -0.0659 -0.0286;-0.0659 0.7838 0.1233;-0.0286 0.1233 0.5536]

Y=[-0.6904 0.0440 -0.0043;-0.0030 -0.8163 -0.0046;-0.0152 -0.0758 -0.7066]

Path Method is applied to the BMI problem

The method lasts 4.2197 seconds

The method found a feasible solution given in the following

X=[0.9870 -0.0162 -0.0599;-0.0162 0.9798 -0.0745;-0.0599 -0.0745 0.7248]

Y=[-0.5695 -0.0360 -0.1952;0.3507 -0.9011 0.0939;0.0827 -0.1033 -0.7160]

ILMI Method is applied to the BMI problem

The method lasts 0.7221 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 19.0502 seconds

The method found a feasible solution given in the following

X=[0.3641 0.1526 0.0000;0.1526 0.9634 -0.0000;0.0000 -0.0000 1.0000]

Y=[-0.5666 -0.1000 0.1253;-0.0406 -0.8606 -0.0473;-0.1262 0.0164 -0.8782]

BMI problem number 8 in this batch has the following matrices (Rs)

R1=[0.7368 -0.4744 0.7267;-0.4744 -0.0467 -0.9312;0.7267 -0.9312 -0.5061]

R2=[-0.8974 0.7250 -0.1249;0.7250 -0.1507 0.2570;-0.1249 0.2570 0.0604]

R3=[-1.1622 -0.1066 -0.1126;-0.1066 -0.2080 0.4883;-0.1126 0.4883 0.7094]

R4=[0.2698 -0.2982 0.7069;-0.2982 -0.2838 0.7937;0.7069 0.7937 0.2076]

Benders Method is applied to the BMI problem

The method lasts 2.1598 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.4721 seconds

The method found a feasible solution given in the following

X=[0.9337 -0.0174 0.0796;-0.0174 0.9953 0.0207;0.0796 0.0207 0.9042]

Y=[-0.8413 -0.0291 -0.1948;0.3235 -0.7041 -0.0171;0.0380 0.0679 -0.8760]

ILMI Method is applied to the BMI problem

The method lasts 1.5271 seconds

The method found a feasible solution given in the following

$X = [0.9305 \ -0.0401 \ 0.1049; -0.0401 \ 0.5955 \ -0.0832; 0.1049 \ -0.0832 \ 0.7878]$

$Y = [-0.9159 \ 0.0831 \ -0.1192; 0.0088 \ -0.7389 \ 0.0983; -0.0133 \ -0.0267 \ -0.8657]$

Proposed Method is applied to the BMI problem

The method lasts 224.5946 seconds

The method found a feasible solution given in the following

$X = [0.6250 \ -0.2546 \ 0.2294; -0.2546 \ 0.6772 \ 0.0000; 0.2294 \ 0.0000 \ 0.6977]$

$Y = [-0.7122 \ 0.0636 \ -0.1798; 0.2364 \ -0.7946 \ -0.0284; -0.1095 \ -0.0112 \ -0.8080]$

BMI problem number 9 in this batch has the following matrices (Rs)

$R1 = [-0.4735 \ -0.4273 \ 0.6376; -0.4273 \ -0.3357 \ -0.3098; 0.6376 \ -0.3098 \ 0.6741]$

$R2 = [0.3560 \ -0.4789 \ -0.2972; -0.4789 \ -0.9197 \ -0.0068; -0.2972 \ -0.0068 \ -0.5690]$

$R3 = [-0.9685 \ 0.0667 \ -0.2763; 0.0667 \ 0.0691 \ 0.5267; -0.2763 \ 0.5267 \ 0.4358]$

$R4 = [0.2669 \ 0.5103 \ -0.3785; 0.5103 \ 0.1764 \ 0.5012; -0.3785 \ 0.5012 \ -0.9231]$

Benders Method is applied to the BMI problem

The method lasts 2.2308 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 4.3043 seconds

The method found a feasible solution given in the following

$X=[0.9756 \ 0.0047 \ 0.0231; 0.0047 \ 0.9991 \ -0.0045; 0.0231 \ -0.0045 \ 0.9781]$

$Y=[-0.8666 \ 0.1904 \ -0.3983; -0.0746 \ -0.9514 \ -0.1699; 0.0918 \ -0.0710 \ -0.6581]$

ILMI Method is applied to the BMI problem

The method lasts 0.6785 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 305.0737 seconds

The method found a feasible solution given in the following

$X=[0.7320 \ -0.0000 \ 0.1796; -0.0000 \ 0.6250 \ -0.0000; 0.1796 \ -0.0000 \ 0.8796]$

$Y=[-0.8253 \ -0.0390 \ -0.0373; 0.0136 \ -0.7698 \ 0.0460; -0.1167 \ -0.0722 \ -0.8877]$

BMI problem number 10 in this batch has the following matrices (Rs)

$R1=[-0.0398 \ 0.7998 \ -0.5102; 0.7998 \ 0.4917 \ -0.4450; -0.5102 \ -0.4450 \ 0.0951]$

$R2=[-0.1575 \ 0.2017 \ -0.7998; 0.2017 \ -0.4775 \ 0.0544; -0.7998 \ 0.0544 \ 0.3357]$

$R3=[-0.5391 \ 0.1521 \ 0.5263; 0.1521 \ -0.1838 \ -0.0225; 0.5263 \ -0.0225 \ -0.2910]$

$R4=[-0.3918 \ 0.8605 \ 0.2753; 0.8605 \ 0.6266 \ 0.5147; 0.2753 \ 0.5147 \ -1.1025]$

Benders Method is applied to the BMI problem

The method lasts 2.1832 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 0.7808 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.6993 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 192.5124 seconds

The method found a feasible solution given in the following

$X = [0.5827 \ 0.1992 \ -0.3595; 0.1992 \ 0.8710 \ 0.1186; -0.3595 \ 0.1186 \ 0.6077]$

$Y = [-0.6703 \ -0.1570 \ 0.2967; -0.1525 \ -0.8215 \ -0.1650; 0.1386 \ 0.1140 \ -0.6015]$

From here, 10 BMIs in the batch related to $n=7$ and $r=1$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

$R1 = [-0.8598 \ 0.0727 \ 0.0708 \ 0.2767 \ -0.2968 \ -0.3981 \ 0.0871; 0.0727 \ -0.2935 \ -0.0139 \ 0.2018 \ 0.9382 \ -0.2475 \ -0.0805; 0.0708 \ -0.0139 \ -1.2096 \ -0.7445 \ 0.7101 \ 0.0122 \ 0.6077; 0.2767 \ 0.2018 \ -0.7445 \ 0.2481 \ 0.1635 \ 0.6185 \ 0.0190; -0.2968 \ 0.9382 \ 0.7101 \ 0.1635 \ -0.9812 \ 0.0258 \ -0.7377; -0.3981 \ -0.2475 \ 0.0122 \ 0.6185 \ 0.0258 \ -0.4587 \ -0.2908; 0.0871 \ -0.0805 \ 0.6077 \ 0.0190 \ -0.7377 \ -0.2908 \ -0.2432]$

Benders Method is applied to the BMI problem

The method lasts 4.1899 seconds

The method found a feasible solution given in the following

X=[0.5003 -0.0024 0.0027 -0.0069 -0.0022 -0.0035 0.0037;-0.0024 0.5218 -0.0247 0.0636
0.0206 0.0319 -0.0337;0.0027 -0.0247 0.5279 -0.0718 -0.0233 -0.0360 0.0381;-0.0069 0.0636 -
0.0718 0.6849 0.0599 0.0928 -0.0981;-0.0022 0.0206 -0.0233 0.0599 0.5194 0.0301 -0.0318;-
0.0035 0.0319 -0.0360 0.0928 0.0301 0.5465 -0.0492;0.0037 -0.0337 0.0381 -0.0981 -0.0318 -
0.0492 0.5521]

Y=[-0.2518 -0.0103 0.0195 -0.0526 0.0486 0.0774 -0.0579;-0.0103 -0.4503 -0.0389 -0.0635 -
0.2217 0.0581 0.0735;0.0195 -0.0389 -0.2828 0.1750 -0.0611 0.0547 -0.0811;-0.0526 -0.0635
0.1750 -0.6252 -0.0055 -0.1749 0.0476;0.0486 -0.2217 -0.0611 -0.0055 -0.3763 -0.0165
0.1474;0.0774 0.0580 0.0547 -0.1749 -0.0165 -0.3711 0.0840;-0.0579 0.0735 -0.0811 0.0475
0.1474 0.0840 -0.4576]

Path Method is applied to the BMI problem

The method lasts 2.1233 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.7969 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[-0.0713 0.1326 0.1879 0.0781 0.4792 -0.9380 0.1740;0.1326 0.4168 -0.4356 -0.5266 -
0.0805 0.1793 0.1368;0.1879 -0.4356 -0.0201 -0.6915 0.7843 -0.0591 0.1003;0.0781 -0.5266 -
0.6915 0.3529 -0.2559 0.6585 -0.7748;0.4792 -0.0805 0.7843 -0.2559 0.2360 0.5608 0.4828;-
0.9380 0.1793 -0.0591 0.6585 0.5608 -1.0497 0.3039;0.1740 0.1368 0.1003 -0.7748 0.4828
0.3039 -0.9632]

Benders Method is applied to the BMI problem

The method lasts 4.8989 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.7087 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8265 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 3 in this batch has the following matrices (Rs)

R1=[0.6938 -0.2125 0.2960 -0.1685 -0.0547 0.0705 0.1116;-0.2125 0.6504 0.1409 0.5096 -0.4888 -0.1279 -0.5307;0.2960 0.1409 -1.2972 -0.1406 0.5031 0.6009 0.6105;-0.1685 0.5096 -0.1406 -1.1185 0.3824 0.2770 0.2217;-0.0547 -0.4888 0.5031 0.3824 -0.8986 -0.0711 -0.1874;0.0705 -0.1279 0.6009 0.2770 -0.0711 0.3669 -0.1688;0.1116 -0.5307 0.6105 0.2217 -0.1874 -0.1688 -0.0170]

Benders Method is applied to the BMI problem

The method lasts 4.2373 seconds

The method found a feasible solution given in the following

X=[0.5874 -0.1275 0.0307 -0.0227 0.0235 0.0251 0.0656;-0.1275 0.6861 -0.0449 0.0331 -0.0343 -0.0366 -0.0957;0.0307 -0.0449 0.5108 -0.0080 0.0083 0.0088 0.0231;-0.0227 0.0331 -0.0080 0.5059 -0.0061 -0.0065 -0.0170;0.0235 -0.0343 0.0083 -0.0061 0.5063 0.0067 0.0176;0.0251 -0.0366 0.0088 -0.0065 0.0067 0.5072 0.0188;0.0656 -0.0957 0.0231 -0.0170 0.0176 0.0188 0.5492]

Y=[-0.7083 0.0551 -0.0778 0.0549 0.0145 -0.0288 -0.0438;0.0551 -0.7065 0.0170 -0.1063 0.1076 0.0117 0.1520;-0.0778 0.0170 -0.2509 -0.0301 -0.0354 -0.1364 -0.0979;0.0549 -0.1063 -0.0301 -0.2232 -0.0200 -0.0606 -0.0124;0.0145 0.1076 -0.0354 -0.0200 -0.2530 -0.0281 -0.0098;-0.0288 0.0117 -0.1364 -0.0606 -0.0281 -0.6243 0.0211;-0.0438 0.1520 -0.0979 -0.0124 -0.0098 0.0211 -0.4768]

Path Method is applied to the BMI problem

The method lasts 2.2345 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8059 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 4 in this batch has the following matrices (Rs)

R1=[-0.5129 -0.1897 -0.3579 0.3776 0.3315 -0.2377 -0.7270;-0.1897 0.5427 -0.1588 -0.1188 0.7114 0.0615 0.0099;-0.3579 -0.1588 0.1581 -0.2564 -0.0007 -0.1498 0.2923;0.3776 -0.1188 -0.2564 -0.3030 -0.6845 -0.3486 0.1286;0.3315 0.7114 -0.0007 -0.6845 -0.4365 -0.5782 0.2732;-0.2377 0.0615 -0.1498 -0.3486 -0.5782 -1.0379 0.1718;-0.7270 0.0099 0.2923 0.1286 0.2732 0.1718 0.3379]

Benders Method is applied to the BMI problem

The method lasts 7.2017 seconds

The method found a feasible solution given in the following

X=[0.5874 -0.0064 -0.0837 0.0349 -0.0095 -0.0182 -0.1252;-0.0064 0.7335 -0.0200 -0.0859 0.1568 -0.0199 0.0144;-0.0837 -0.0200 0.5831 -0.0241 -0.0084 0.0198 0.1193;0.0349 -0.0859 -0.0241 0.5438 -0.0596 0.0003 -0.0519;-0.0095 0.1568 -0.0084 -0.0596 0.6056 -0.0123 0.0171;-0.0182 -0.0199 0.0198 0.0003 -0.0123 0.5057 0.0256;-0.1252 0.0144 0.1193 -0.0519 0.0171 0.0256 0.6794]

Y=[-0.4495 0.0480 0.1099 -0.0927 -0.0782 0.1041 0.2168;0.0480 -0.7658 0.0687 0.0455 -0.2008 -0.0052 -0.0136;0.1099 0.0687 -0.6588 0.0951 -0.0158 0.0455 -0.0771;-0.0927 0.0455 0.0951 -0.5423 0.1686 0.0650 -0.0400;-0.0782 -0.2008 -0.0158 0.1686 -0.5187 0.1294 -0.0508;0.1041 -0.0052 0.0455 0.0650 0.1294 -0.3221 -0.0340;0.2168 -0.0136 -0.0771 -0.0400 -0.0508 -0.0340 -0.7181]

Path Method is applied to the BMI problem

The method lasts 3.3186 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8007 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 5 in this batch has the following matrices (Rs)

R1=[-0.7220 0.1835 0.3511 0.2947 -0.6845 -0.4791 -0.1417;0.1835 -0.1342 -0.2761 0.0306 -
0.1318 -0.8463 0.0000;0.3511 -0.2761 -0.6994 0.5390 0.5028 -0.4633 -0.3225;0.2947 0.0306
0.5390 -0.1776 0.8956 0.2924 -0.4160;-0.6845 -0.1318 0.5028 0.8956 0.6168 -0.4087 0.1199;-
0.4791 -0.8463 -0.4633 0.2924 -0.4087 -0.6313 0.5148;-0.1417 0.0000 -0.3225 -0.4160 0.1199
0.5148 0.5496]

Benders Method is applied to the BMI problem

The method lasts 5.2446 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.2702 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.9376 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 6 in this batch has the following matrices (Rs)

R1=[-0.5671 0.3188 0.0189 0.0567 -0.1045 0.4787 0.4600;0.3188 0.4321 -0.3041 0.0530 -0.5864 0.5945 0.3508;0.0189 -0.3041 -0.5977 -0.8127 0.5035 0.2237 -0.1444;0.0567 0.0530 -0.8127 0.3354 0.0033 -0.2943 0.3061;-0.1045 -0.5864 0.5035 0.0033 0.5302 -0.3138 0.0034;0.4787 0.5945 0.2237 -0.2943 -0.3138 -0.5620 -0.1422;0.4600 0.3508 -0.1444 0.3061 0.0034 -0.1422 -0.6606]

Benders Method is applied to the BMI problem

The method lasts 5.1481 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.2393 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8078 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[-0.4091 -0.1180 0.6117 0.1196 0.3034 0.0990 -0.0718;-0.1180 -1.2608 -0.2058 -0.3734 0.3097 -0.0417 0.0056;0.6117 -0.2058 -0.4191 -0.5457 -0.0953 -0.1728 0.1472;0.1196 -0.3734 -0.5457 0.2950 -0.4770 0.0680 -0.3552;0.3034 0.3097 -0.0953 -0.4770 -0.8503 0.1185 0.4617;0.0990 -0.0417 -0.1728 0.0680 0.1185 -0.7776 0.8297;-0.0718 0.0056 0.1472 -0.3552 0.4617 0.8297 0.1569]

Benders Method is applied to the BMI problem

The method lasts 4.6246 seconds

The method found a feasible solution given in the following

X=[0.5031 0.0036 0.0082 -0.0203 0.0106 0.0080 0.0201;0.0036 0.5042 0.0096 -0.0237 0.0124 0.0093 0.0235;0.0082 0.0096 0.5219 -0.0542 0.0284 0.0213 0.0538;-0.0203 -0.0237 -0.0542 0.6342 -0.0704 -0.0528 -0.1330;0.0106 0.0124 0.0284 -0.0704 0.5369 0.0277 0.0698;0.0080 0.0093 0.0213 -0.0528 0.0277 0.5208 0.0524;0.0201 0.0235 0.0538 -0.1330 0.0698 0.0524 0.6319]

Y=[-0.4139 0.0428 -0.1847 -0.0186 -0.0483 -0.0096 0.0052;0.0428 -0.1983 0.0372 0.1050 -0.0583 0.0092 -0.0125;-0.1847 0.0372 -0.4252 0.1632 -0.0108 0.0422 -0.0158;-0.0186 0.1050 0.1632 -0.6433 0.1428 -0.0342 0.1080;-0.0483 -0.0583 -0.0108 0.1428 -0.2802 -0.0546 -0.1366;-0.0096 0.0092 0.0422 -0.0342 -0.0546 -0.3232 -0.2495;0.0052 -0.0125 -0.0158 0.1080 -0.1366 -0.2495 -0.6054]

Path Method is applied to the BMI problem

The method lasts 2.2089 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8439 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 8 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} 0.5298 & -0.5303 & 0.2227 & -0.2076 & 0.2330 & 0.6256 & 0.5723; & -0.5303 & 0.2114 & -0.0288 & 0.3892 & - \\ 0.1084 & 0.0646 & 0.4125; & 0.2227 & -0.0288 & 0.5675 & 0.0747 & 0.5590 & 0.3764 & 0.0394; & -0.2076 & 0.3892 \\ 0.0747 & -0.0553 & -0.1748 & -0.5506 & -0.7273; & 0.2330 & -0.1084 & 0.5590 & -0.1748 & 0.4375 & 0.3799 & - \\ 0.1826; & 0.6256 & 0.0646 & 0.3764 & -0.5506 & 0.3799 & 0.0069 & -0.1928; & 0.5723 & 0.4125 & 0.0394 & -0.7273 & - \\ 0.1826 & -0.1928 & -0.9571 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 5.1776 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.9386 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.7940 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 9 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} 0.5470 & -0.3799 & 0.4240 & -0.0666 & -0.1438 & 0.1790 & 0.7303; & -0.3799 & 0.4357 & 0.5761 & 0.1452 \\ 0.0343 & -0.4962 & 0.1629; & 0.4240 & 0.5761 & -0.2392 & -0.6942 & 0.8266 & 0.1148 & -0.6135; & -0.0666 & 0.1452 & - \\ 0.6942 & -0.2544 & -0.4564 & 0.4982 & -0.5417; & -0.1438 & 0.0343 & 0.8266 & -0.4564 & -0.1259 & 0.2468 \\ 0.4406; & 0.1790 & -0.4962 & 0.1148 & 0.4982 & 0.2468 & -0.8501 & 0.6682; & 0.7303 & 0.1629 & -0.6135 & -0.5417 \\ 0.4406 & 0.6682 & 0.3145 \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 6.8559 seconds

The method found a feasible solution given in the following

$X = \begin{bmatrix} 0.6602 & -0.0712 & 0.0033 & -0.0544 & 0.0515 & 0.0680 & 0.1651; & -0.0712 & 0.6033 & 0.0938 & -0.0406 & 0.0527 \\ -0.0483 & -0.0698; & 0.0033 & 0.0938 & 0.6267 & -0.0872 & 0.1015 & -0.0226 & 0.0081; & -0.0544 & -0.0406 & -0.0872 \end{bmatrix}$

0.5770 -0.0858 -0.0068 -0.0593;0.0515 0.0527 0.1015 -0.0858 0.5963 0.0028 0.0569;0.0680 -
0.0483 -0.0226 -0.0068 0.0028 0.5334 0.0692;0.1651 -0.0698 0.0081 -0.0593 0.0569 0.0692
0.6704]

Y=[-0.7072 0.0981 -0.1002 0.0366 0.0406 -0.0711 -0.1743;0.0981 -0.7035 -0.1235 -0.0114 -
0.0168 0.1164 -0.0347;-0.1002 -0.1235 -0.5358 0.1661 -0.2135 0.0389 0.1315;0.0366 -0.0114
0.1661 -0.4619 0.1730 -0.0653 0.1001;0.0406 -0.0168 -0.2135 0.1730 -0.4969 -0.0719 -0.1083;-
0.0711 0.1164 0.0389 -0.0653 -0.0719 -0.3146 -0.1456;-0.1743 -0.0347 0.1315 0.1001 -0.1083 -
0.1456 -0.6842]

Path Method is applied to the BMI problem

The method lasts 2.8911 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8830 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[-0.4407 0.3680 -0.1380 0.0215 -0.2653 -0.1334 0.2237;0.3680 -0.0439 0.2998 -0.3872 -
0.2386 0.3604 -0.0816;-0.1380 0.2998 0.0705 -0.6629 0.0698 0.3252 -0.0108;0.0215 -0.3872 -
0.6629 -0.7413 -0.6125 -0.0062 0.1704;-0.2653 -0.2386 0.0698 -0.6125 -1.0671 -0.0134 -

0.6494;-0.1334 0.3604 0.3252 -0.0062 -0.0134 -0.7335 -0.2642;0.2237 -0.0816 -0.0108 0.1704 -
0.6494 -0.2642 0.0572]

Benders Method is applied to the BMI problem

The method lasts 4.3731 seconds

The method found a feasible solution given in the following

X=[0.5038 -0.0137 -0.0216 0.0163 -0.0092 -0.0096 0.0148;-0.0137 0.5499 0.0785 -0.0594
0.0334 0.0349 -0.0538;-0.0216 0.0785 0.6236 -0.0935 0.0526 0.0550 -0.0847;0.0163 -0.0594 -
0.0935 0.5707 -0.0398 -0.0416 0.0641;-0.0092 0.0334 0.0526 -0.0398 0.5224 0.0234 -0.0361;-
0.0096 0.0349 0.0550 -0.0416 0.0234 0.5245 -0.0377;0.0148 -0.0538 -0.0847 0.0641 -0.0361 -
0.0377 0.5581]

Y=[-0.3613 -0.1258 0.0417 -0.0182 0.0845 0.0259 -0.0916;-0.1258 -0.5148 -0.1242 0.1034
0.0507 -0.1073 0.0114;0.0417 -0.1242 -0.5475 0.1993 -0.0453 -0.0983 0.0070;-0.0182 0.1034
0.1993 -0.3413 0.1090 0.0342 -0.0822;0.0845 0.0507 -0.0453 0.1090 -0.2890 -0.0080
0.1840;0.0259 -0.1073 -0.0983 0.0342 -0.0080 -0.2824 0.0777;-0.0916 0.0114 0.0070 -0.0822
0.1840 0.0777 -0.5529]

Path Method is applied to the BMI problem

The method lasts 2.3414 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.7719 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

From here, 10 BMIs in the batch related to $n=7$ and $r=2$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.2824 & 0.1012 & 0.3190 & 0.5387 & 0.2891 & -0.0478 & 0.0953 & 0.1012 & -0.5612 & 0.3626 & -0.0007 \\ 0.3936 & 0.1038 & -0.1714 & 0.3190 & 0.3626 & 0.4791 & -0.4815 & -0.0852 & -0.1966 & 0.6654 & 0.5387 & -0.0007 \\ 0.4815 & -1.0766 & -0.0279 & 0.1598 & 0.0875 & 0.2891 & 0.3936 & -0.0852 & -0.0279 & 0.4828 & -0.4083 & 0.2443 \\ 0.0478 & 0.1038 & -0.1966 & 0.1598 & -0.4083 & -1.2781 & -0.5502 & 0.0953 & -0.1714 & 0.6654 & 0.0875 & 0.2443 \\ 0.5502 & 0.0308 & & & & & & & & & & \end{bmatrix}$

$R2 = \begin{bmatrix} 0.2597 & -0.2361 & 0.6578 & 0.2820 & 0.5539 & -0.5177 & -0.4075 & -0.2361 & 0.2515 & -0.3907 & 0.1009 & -0.0006 \\ -0.0653 & 0.3201 & 0.6578 & -0.3907 & -0.3412 & -0.6656 & -0.1025 & 0.3904 & -0.1380 & 0.2820 & 0.1009 & -0.6656 \\ 0.0525 & 0.9061 & -0.3587 & 0.4140 & 0.5539 & -0.0006 & -0.1025 & 0.9061 & 0.6006 & -0.1404 & 0.2664 & -0.5177 \\ -0.0653 & 0.3904 & -0.3587 & -0.1404 & -0.4317 & -0.4950 & -0.4075 & 0.3201 & -0.1380 & 0.4140 & 0.2664 & -0.4950 \\ -0.5012 & & & & & & & & & & \end{bmatrix}$

Benders Method is applied to the BMI problem

The method lasts 5.4106 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.2977 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 3.9441 seconds

The method found a feasible solution given in the following

X=[0.6666 -0.1689 0.1253 0.1248 0.1261 0.1094 0.0166;-0.1689 0.7534 0.0452 0.0854 0.1007 0.0762 0.0551;0.1253 0.0452 0.8822 -0.1084 -0.0465 -0.0547 0.0061;0.1248 0.0854 -0.1084 0.8230 -0.0133 -0.0737 0.0274;0.1261 0.1007 -0.0465 -0.0133 0.8413 -0.1135 0.0084;0.1094 0.0762 -0.0547 -0.0737 -0.1135 0.7461 -0.0642;0.0166 0.0551 0.0061 0.0274 0.0084 -0.0642 0.8531]

Y=[-0.6094 0.1188 -0.1251 -0.1134 -0.1459 0.0234 0.0480;0.1099 -0.6334 0.0148 -0.0379 -0.0668 0.0121 -0.0877;-0.1516 -0.0140 -0.7393 0.1736 0.0425 0.0320 -0.0751;-0.1235 -0.0303 0.1650 -0.6668 -0.1048 0.0934 -0.0358;-0.1275 -0.0298 0.0110 -0.1093 -0.7609 0.0692 -0.0475;0.0321 0.0070 0.0077 0.0900 0.0999 -0.5191 0.1177;0.0560 -0.0693 -0.0829 -0.0550 -0.0618 0.1052 -0.6648]

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[-0.7265 -0.4819 0.0449 -0.7503 -0.1158 -0.5071 -0.2724;-0.4819 0.4659 -0.1474 -0.0033 0.1048 -0.0683 -0.1944;0.0449 -0.1474 -0.1193 -0.2622 -0.1659 -0.3054 -0.4706;-0.7503 -0.0033 -0.2622 -1.1031 -0.2410 0.7752 0.2100;-0.1158 0.1048 -0.1659 -0.2410 0.0178 -0.2379 0.2176;-0.5071 -0.0683 -0.3054 0.7752 -0.2379 -0.9974 -0.2940;-0.2724 -0.1944 -0.4706 0.2100 0.2176 -0.2940 -0.2140]

R2=[-1.0656 0.0601 -0.4605 -0.4260 -0.1075 0.2102 -0.4887;0.0601 -1.1238 0.1882 -0.2098 -0.0456 -0.2009 0.2056;-0.4605 0.1882 -0.1348 0.2201 0.2044 -0.5386 -0.0213;-0.4260 -0.2098 0.2201 -0.1501 0.4818 0.0561 -0.3135;-0.1075 -0.0456 0.2044 0.4818 0.3839 -0.3049 0.6898;0.2102 -0.2009 -0.5386 0.0561 -0.3049 -0.4375 0.7842;-0.4887 0.2056 -0.0213 -0.3135 0.6898 0.7842 -0.8970]

Benders Method is applied to the BMI problem

The method lasts 7.5172 seconds

The method found a feasible solution given in the following

X=[0.6023 -0.0951 0.0255 -0.0973 -0.0752 -0.0250 -0.0438;-0.0951 0.6186 -0.0838 0.0713
0.0025 0.0613 0.0348;0.0255 -0.0838 0.6264 0.0140 0.1159 -0.0822 0.0010;-0.0973 0.0713
0.0140 0.6047 0.1144 -0.0004 0.0455;-0.0752 0.0025 0.1159 0.1144 0.7063 -0.0668 0.0456;-
0.0250 0.0613 -0.0822 -0.0004 -0.0668 0.5542 0.0032;-0.0438 0.0348 0.0010 0.0455 0.0456
0.0032 0.5200]

Y=[-0.4855 0.1076 0.0072 0.1949 0.0338 0.0345 0.0804;0.0868 -0.7057 0.0365 0.0354 -0.0482 -
0.0635 0.0477;0.0169 0.0410 -0.6519 -0.0106 -0.0830 0.0971 0.0833;0.2040 0.0085 0.0027 -
0.5905 -0.0822 0.0022 -0.0128;0.0099 -0.0314 -0.0782 -0.0542 -0.7235 0.0641 -0.1032;0.0086 -
0.0331 0.0570 0.0211 0.0318 -0.6509 -0.0259;0.0632 0.0558 0.0839 0.0074 -0.1010 -0.0278 -
0.5430]

Path Method is applied to the BMI problem

The method lasts 2.3595 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.0009 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 3 in this batch has the following matrices (Rs)

R1=[-0.4097 -0.4275 0.6936 0.6146 0.3165 0.0311 -0.3398;-0.4275 -0.3202 0.3269 -0.3114
0.1180 0.5428 -0.0275;0.6936 0.3269 0.3298 -0.1370 -0.7785 0.0565 -0.6731;0.6146 -0.3114 -
0.1370 -0.6921 -0.1819 0.4552 -0.5664;0.3165 0.1180 -0.7785 -0.1819 -1.1794 0.4053 -
0.5166;0.0311 0.5428 0.0565 0.4552 0.4053 -0.9540 0.4252;-0.3398 -0.0275 -0.6731 -0.5664 -
0.5166 0.4252 -0.6409]

R2=[-0.7712 -0.6578 -0.6565 0.3432 0.1961 0.1242 -0.2168;-0.6578 -1.1027 -0.3272 -0.9029
0.5556 0.0306 -0.5123;-0.6565 -0.3272 0.3773 0.1521 0.8863 0.5220 -0.1341;0.3432 -0.9029
0.1521 -0.7205 -0.5353 -0.2729 0.0395;0.1961 0.5556 0.8863 -0.5353 -1.2446 0.7532
0.1204;0.1242 0.0306 0.5220 -0.2729 0.7532 -1.2432 -0.0043;-0.2168 -0.5123 -0.1341 0.0395
0.1204 -0.0043 -0.1869]

Benders Method is applied to the BMI problem

The method lasts 7.3981 seconds

The method found a feasible solution given in the following

X=[0.6283 -0.0434 0.0404 0.0799 -0.0694 -0.0465 -0.0688;-0.0434 0.5186 0.0209 -0.0298
0.0350 0.0241 0.0143;0.0404 0.0209 0.8192 0.0009 0.0801 0.0596 -0.1016;0.0799 -0.0298
0.0009 0.5517 -0.0513 -0.0348 -0.0365;-0.0694 0.0350 0.0801 -0.0513 0.5715 0.0498 0.0106;-
0.0465 0.0241 0.0596 -0.0348 0.0498 0.5348 0.0056;-0.0688 0.0143 -0.1016 -0.0365 0.0106
0.0056 0.5577]

Y=[-0.6086 0.0841 -0.0466 -0.1572 0.0934 0.0414 0.1187;0.0260 -0.5320 0.0198 0.1219 0.0484
-0.0603 0.0958;-0.0129 -0.0322 -0.8790 0.0208 -0.0535 -0.0702 0.0686;-0.1069 0.1411 -0.0310
-0.5531 0.0357 -0.0297 -0.0320;0.0887 0.0014 -0.0424 0.0731 -0.6068 -0.1665 0.0613;0.0447 -
0.0951 -0.0596 0.0002 -0.1698 -0.4231 -0.0302;0.1730 0.0506 0.0590 0.0257 0.0156 -0.0584 -
0.6264]

Path Method is applied to the BMI problem

The method lasts 2.2852 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.0150 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 4 in this batch has the following matrices (Rs)

R1=[0.3440 -0.1858 -0.4559 -0.5115 -0.5598 -0.5453 0.2068;-0.1858 -0.8850 0.2740 -0.6948 -0.4281 0.1299 0.4316;-0.4559 0.2740 0.0497 0.2213 -0.3186 0.0168 0.2666;-0.5115 -0.6948 0.2213 0.4762 -0.6604 0.0979 0.2239;-0.5598 -0.4281 -0.3186 -0.6604 -0.6407 -0.2866 0.2712;-0.5453 0.1299 0.0168 0.0979 -0.2866 0.2568 -0.0556;0.2068 0.4316 0.2666 0.2239 0.2712 -0.0556 0.1965]

R2=[-0.1398 0.7884 -0.1037 0.4622 0.5800 -0.3779 0.6575;0.7884 -0.3596 -0.8183 -0.3983 -0.5148 -0.2047 -0.1837;-0.1037 -0.8183 0.6024 -0.0230 0.5872 0.5839 0.1088;0.4622 -0.3983 -0.0230 0.3512 0.3512 -0.0679 -0.0897;0.5800 -0.5148 0.5872 0.3512 0.2453 -0.1215 -0.0614;-0.3779 -0.2047 0.5839 -0.0679 -0.1215 -0.9536 0.0449;0.6575 -0.1837 0.1088 -0.0897 -0.0614 0.0449 -0.6153]

Benders Method is applied to the BMI problem

The method lasts 5.4751 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.4351 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.9175 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 5 in this batch has the following matrices (Rs)

R1=[-0.5962 -0.0114 -0.1314 -0.3183 0.2308 0.0713 -0.7195;-0.0114 -0.6723 -0.9135 0.1154 -0.0932 0.0773 0.3466;-0.1314 -0.9135 -0.9932 -0.4590 -0.7244 -0.0926 -0.4369;-0.3183 0.1154 -0.4590 0.1216 0.4444 -0.1902 0.1861;0.2308 -0.0932 -0.7244 0.4444 0.5007 0.3737 0.7847;0.0713 0.0773 -0.0926 -0.1902 0.3737 -0.2917 -0.5678;-0.7195 0.3466 -0.4369 0.1861 0.7847 -0.5678 -1.0407]

R2=[-0.6796 0.2681 0.2752 0.3740 0.0517 0.4887 0.0604;0.2681 -0.9121 -0.0381 0.4387 0.1610 -0.2971 0.5527;0.2752 -0.0381 -0.8167 0.3358 0.0658 -0.2846 -0.6671;0.3740 0.4387 0.3358 -0.1932 -0.3942 0.7610 0.3339;0.0517 0.1610 0.0658 -0.3942 0.5114 0.6241 -0.1015;0.4887 -0.2971 -0.2846 0.7610 0.6241 -0.1350 0.1516;0.0604 0.5527 -0.6671 0.3339 -0.1015 0.1516 -0.8811]

Benders Method is applied to the BMI problem

The method lasts 5.4499 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.4529 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.9745 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 6 in this batch has the following matrices (Rs)

R1=[0.3869 -0.4000 0.4239 0.3829 0.2475 0.2519 0.7006;-0.4000 0.1985 -0.1375 -0.1128
0.2801 0.4294 0.5064;0.4239 -0.1375 -0.4995 0.1881 0.0864 0.0707 -0.6619;0.3829 -0.1128
0.1881 0.3423 -0.6842 0.1510 0.7966;0.2475 0.2801 0.0864 -0.6842 -0.9085 0.3976
0.3590;0.2519 0.4294 0.0707 0.1510 0.3976 0.1024 -0.4319;0.7006 0.5064 -0.6619 0.7966
0.3590 -0.4319 -0.1939]

R2=[0.3944 -0.1096 0.5317 -0.0649 0.6563 -0.1445 -0.2881;-0.1096 -0.6466 0.0187 -0.3529 -
0.0121 0.0114 -0.6200;0.5317 0.0187 0.0804 0.2779 -0.1760 -0.4825 0.1259;-0.0649 -0.3529
0.2779 0.1123 0.7451 -0.1981 0.5395;0.6563 -0.0121 -0.1760 0.7451 -1.0355 -0.6189 -0.2853;-
0.1445 0.0114 -0.4825 -0.1981 -0.6189 0.1687 -0.4679;-0.2881 -0.6200 0.1259 0.5395 -0.2853 -
0.4679 -0.6423]

Benders Method is applied to the BMI problem

The method lasts 8.1930 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.3343 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.9028 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 7 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.8516 & -0.2837 & -0.4130 & 0.3225 & 0.0132 & -0.4202 & -0.3013 & -0.2837 & -0.2600 & -0.5356 & 0.5165 & -0.0328 & 0.6914 & -0.6642 \\ -0.4130 & -0.5356 & -0.7857 & 0.7702 & -0.3509 & -0.1120 & -0.4940 & 0.3225 & 0.5165 & 0.7702 & -0.6827 & -0.1447 & -0.0017 & -0.0437 \\ 0.0132 & -0.0328 & -0.3509 & -0.1447 & 0.4159 & -0.0741 & -0.3728 & -0.4202 & 0.6914 & -0.1120 & -0.0017 & -0.0741 & -0.9555 & 0.3346 \\ -0.3013 & -0.6642 & -0.4940 & -0.0437 & -0.3728 & 0.3346 & -1.1764 \end{bmatrix}$

$R2 = \begin{bmatrix} -1.0974 & -0.4220 & -0.2685 & 0.2626 & 0.2002 & -0.3551 & -0.4736 & -0.4220 & 0.6999 & 0.6237 & 0.1998 & 0.0660 & -0.0000 & -0.1825 \\ -0.2685 & 0.6237 & 0.3806 & 0.2992 & -0.3101 & -0.0579 & 0.6647 & 0.2626 & 0.1998 \end{bmatrix}$

0.2992 0.5261 -0.5255 0.3865 -0.9922;0.2002 0.0660 -0.3101 -0.5255 -0.1540 -0.5421 -0.5025;-
0.3551 -0.0000 -0.0579 0.3865 -0.5421 0.4276 0.3818;-0.4736 -0.1825 0.6647 -0.9922 -0.5025
0.3818 -0.1764]

Benders Method is applied to the BMI problem

The method lasts 8.3805 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.9247 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.9774 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 8 in this batch has the following matrices (Rs)

R1=[-0.2867 -0.2449 -0.6113 -0.2273 0.0465 0.1542 -0.0307;-0.2449 -0.8468 -0.2355 0.1183
0.4800 -0.1725 -0.1286;-0.6113 -0.2355 -1.0825 0.6950 -0.1648 -0.2386 0.1487;-0.2273 0.1183
0.6950 -1.1702 0.2075 0.1378 0.1430;0.0465 0.4800 -0.1648 0.2075 0.0324 0.5091

0.0383;0.1542 -0.1725 -0.2386 0.1378 0.5091 0.1958 -0.0551;-0.0307 -0.1286 0.1487 0.1430
0.0383 -0.0551 -1.2713]

R2=[0.4028 0.0480 0.1644 -0.0069 0.4991 0.5213 0.1704;0.0480 -0.6423 0.9015 0.0911 0.1626
-0.0662 -0.1562;0.1644 0.9015 -1.0734 -0.6172 0.0345 0.7714 0.8745;-0.0069 0.0911 -0.6172
0.2721 -0.0089 0.2192 0.0530;0.4991 0.1626 0.0345 -0.0089 -0.0108 0.0871 -0.3574;0.5213 -
0.0662 0.7714 0.2192 0.0871 -1.1269 0.3890;0.1704 -0.1562 0.8745 0.0530 -0.3574 0.3890
0.3743]

Benders Method is applied to the BMI problem

The method lasts 5.1951 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.5538 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8998 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 9 in this batch has the following matrices (Rs)

R1=[0.1515 0.7283 0.0132 -0.1333 -0.1834 0.5980 0.1447;0.7283 -0.1052 0.2079 -0.4356 -0.0811 0.3564 -0.6022;0.0132 0.2079 0.0978 0.5842 0.3621 0.2753 0.0756;-0.1333 -0.4356 0.5842 -0.0297 -0.4431 -0.5624 0.2944;-0.1834 -0.0811 0.3621 -0.4431 -0.6911 -0.1344 -0.0384;0.5980 0.3564 0.2753 -0.5624 -0.1344 -0.1042 -0.6377;0.1447 -0.6022 0.0756 0.2944 -0.0384 -0.6377 -0.3203]

R2=[-0.5245 -0.2546 -0.7086 0.2305 -0.1122 0.1290 0.3467;-0.2546 -1.0069 0.2715 0.6161 0.0768 0.2277 0.1320;-0.7086 0.2715 -1.1904 0.7188 0.2446 0.2898 0.2023;0.2305 0.6161 0.7188 -0.2978 0.3803 -0.0717 -0.5356;-0.1122 0.0768 0.2446 0.3803 0.1385 0.0590 0.3211;0.1290 0.2277 0.2898 -0.0717 0.0590 0.1621 0.7626;0.3467 0.1320 0.2023 -0.5356 0.3211 0.7626 -0.4643]

Benders Method is applied to the BMI problem

The method lasts 5.1626 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.5460 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8622 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[-0.0475 0.5688 -0.0077 0.2036 -0.2566 0.6181 0.1034;0.5688 0.1804 -0.2178 -0.0091
0.0802 -0.3275 0.6605;-0.0077 -0.2178 -1.0132 0.1078 0.0000 0.2244 -0.5876;0.2036 -0.0091
0.1078 -1.1630 0.3832 -0.2686 0.5657;-0.2566 0.0802 0.0000 0.3832 0.2759 0.1171
0.4369;0.6181 -0.3275 0.2244 -0.2686 0.1171 0.2812 -0.1020;0.1034 0.6605 -0.5876 0.5657
0.4369 -0.1020 -0.8184]

R2=[0.4079 -0.8939 0.2952 -0.0239 -0.0216 0.3838 -0.7200;-0.8939 -0.6765 -0.0880 0.2725 -
0.0372 -0.4977 0.1549;0.2952 -0.0880 0.3559 0.5054 -0.6158 -0.0117 0.2931;-0.0239 0.2725
0.5054 -0.3420 -0.5330 -0.9561 -0.6689;-0.0216 -0.0372 -0.6158 -0.5330 -0.2624 0.0375 -
0.0593;0.3838 -0.4977 -0.0117 -0.9561 0.0375 -0.7122 -0.2564;-0.7200 0.1549 0.2931 -0.6689 -
0.0593 -0.2564 -0.3466]

Benders Method is applied to the BMI problem

The method lasts 7.9035 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.2335 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8083 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

From here, 10 BMIs in the batch related to $n=7$ and $r=3$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

$R1=[0.3563 \ 0.3628 \ 0.4977 \ -0.1670 \ 0.2180 \ 0.2799 \ 0.7809; 0.3628 \ 0.3729 \ 0.0188 \ -0.4970 \ 0.6677$
 $-0.1682 \ 0.0596; 0.4977 \ 0.0188 \ 0.4715 \ 0.4612 \ -0.3698 \ 0.0081 \ -0.2821; -0.1670 \ -0.4970 \ 0.4612 \ -$
 $0.1792 \ -0.2321 \ -0.1020 \ 0.0518; 0.2180 \ 0.6677 \ -0.3698 \ -0.2321 \ -0.4414 \ -0.2696 \ -0.0377; 0.2799 \ -$
 $0.1682 \ 0.0081 \ -0.1020 \ -0.2696 \ -0.6362 \ -0.3287; 0.7809 \ 0.0596 \ -0.2821 \ 0.0518 \ -0.0377 \ -0.3287 \ -$
 $0.2659]$

$R2=[-0.5596 \ -0.0988 \ 0.1356 \ 0.1422 \ 0.0711 \ -0.3002 \ -0.1985; -0.0988 \ -1.1593 \ 0.1033 \ -0.1808 \ -$
 $0.1293 \ 0.3473 \ -0.1105; 0.1356 \ 0.1033 \ -0.5117 \ -0.4820 \ 0.0222 \ -0.1613 \ -0.3426; 0.1422 \ -0.1808 \ -$
 $0.4820 \ -1.2638 \ -0.6900 \ 0.1706 \ 0.1123; 0.0711 \ -0.1293 \ 0.0222 \ -0.6900 \ -0.3811 \ 0.4862 \ 0.0330; -$
 $0.3002 \ 0.3473 \ -0.1613 \ 0.1706 \ 0.4862 \ 0.2275 \ 0.6262; -0.1985 \ -0.1105 \ -0.3426 \ 0.1123 \ 0.0330$
 $0.6262 \ -0.7802]$

$R3=[-1.0456 \ 0.2199 \ 0.7920 \ -0.3775 \ -0.9393 \ 0.3966 \ -0.1037; 0.2199 \ 0.2538 \ 0.4087 \ 0.6037$
 $0.0178 \ 0.6291 \ 0.0333; 0.7920 \ 0.4087 \ 0.0350 \ -0.0403 \ -0.1383 \ -0.2914 \ -0.1986; -0.3775 \ 0.6037 \ -$
 $0.0403 \ 0.0897 \ -0.3631 \ -0.2835 \ -0.1323; -0.9393 \ 0.0178 \ -0.1383 \ -0.3631 \ 0.6497 \ 0.7085 \ -$
 $0.5352; 0.3966 \ 0.6291 \ -0.2914 \ -0.2835 \ 0.7085 \ -0.5891 \ 0.5887; -0.1037 \ 0.0333 \ -0.1986 \ -0.1323 \ -$
 $0.5352 \ 0.5887 \ 0.6942]$

Benders Method is applied to the BMI problem

The method lasts 8.0785 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.8693 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8068 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[-0.0870 -0.4656 0.5358 0.1334 -0.0572 0.0676 0.5641;-0.4656 0.1143 0.3562 -0.1519 0.0840 -0.0857 0.4486;0.5358 0.3562 -0.4965 -0.7087 -0.1220 0.3006 0.7765;0.1334 -0.1519 -0.7087 -1.1841 0.0533 0.1782 0.3405;-0.0572 0.0840 -0.1220 0.0533 -0.8514 -0.1307 0.1670;0.0676 -0.0857 0.3006 0.1782 -0.1307 0.2192 0.3904;0.5641 0.4486 0.7765 0.3405 0.1670 0.3904 -0.7698]

R2=[0.1002 -0.4228 -0.6699 -0.5774 0.3670 -0.0536 0.7785;-0.4228 0.4756 0.3596 0.2780 0.5642 0.0066 0.2593;-0.6699 0.3596 -0.7778 0.2988 -0.4342 -0.4161 0.3999;-0.5774 0.2780 0.2988 -0.7376 0.2658 0.5709 0.1955;0.3670 0.5642 -0.4342 0.2658 0.4053 -0.9807 -0.0444;-0.0536 0.0066 -0.4161 0.5709 -0.9807 -0.3869 0.1591;0.7785 0.2593 0.3999 0.1955 -0.0444 0.1591 -1.2062]

R3=[-0.9299 0.4604 -0.0164 0.6297 0.2145 0.3231 -0.1944;0.4604 0.3708 0.0578 -0.0827 0.7436 0.4311 0.0285;-0.0164 0.0578 -0.6920 0.6431 0.6098 -0.0266 0.5349;0.6297 -0.0827 0.6431 0.2614 -0.7884 -0.3708 -0.3074;0.2145 0.7436 0.6098 -0.7884 -1.1425 -0.6924 0.6525;0.3231 0.4311 -0.0266 -0.3708 -0.6924 -0.8019 -0.3542;-0.1944 0.0285 0.5349 -0.3074 0.6525 -0.3542 -0.5424]

Benders Method is applied to the BMI problem

The method lasts 10.9431 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.6537 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8641 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 3 in this batch has the following matrices (Rs)

R1=[-1.0530 -0.7374 0.1163 0.4109 0.9411 0.0109 -0.4503;-0.7374 -0.6472 -0.6444 0.1160
0.7713 -0.9039 0.4414;0.1163 -0.6444 -1.0416 0.0267 0.5103 0.3480 -0.0745;0.4109 0.1160
0.0267 -1.0930 0.0221 0.3061 0.2394;0.9411 0.7713 0.5103 0.0221 -0.4261 -0.0938 -
0.3712;0.0109 -0.9039 0.3480 0.3061 -0.0938 -0.4423 0.0304;-0.4503 0.4414 -0.0745 0.2394 -
0.3712 0.0304 -0.6552]

R2=[0.6654 0.7614 -0.0451 0.1779 -0.4638 0.4004 0.4527;0.7614 -1.2331 -0.0444 -0.1597 -
0.4984 0.1178 -0.1553;-0.0451 -0.0444 -0.9622 0.5545 0.1971 -0.0603 -0.1859;0.1779 -0.1597

0.5545 -1.2681 -0.2522 -0.1377 0.1211;-0.4638 -0.4984 0.1971 -0.2522 -0.1983 0.7965
0.2077;0.4004 0.1178 -0.0603 -0.1377 0.7965 -0.5801 -0.7507;0.4527 -0.1553 -0.1859 0.1211
0.2077 -0.7507 -1.1756]

R3=[-0.2575 0.2587 -0.4180 -0.1175 0.0304 -0.1547 0.2588;0.2587 0.6820 0.1695 0.5409 -
0.3940 -0.6180 0.4310;-0.4180 0.1695 0.0552 0.1325 0.1720 0.6972 0.5730;-0.1175 0.5409
0.1325 -0.2635 0.4599 0.0315 -0.5561;0.0304 -0.3940 0.1720 0.4599 0.0950 0.5743 -0.5358;-
0.1547 -0.6180 0.6972 0.0315 0.5743 -0.3163 0.3452;0.2588 0.4310 0.5730 -0.5561 -0.5358
0.3452 -0.0192]

Benders Method is applied to the BMI problem

The method lasts 5.2961 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.6907 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8690 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 4 in this batch has the following matrices (Rs)

R1=[-0.2705 0.1256 0.5866 -0.2742 -0.4289 -0.1522 -0.3860;0.1256 0.5427 -0.1728 0.5104
0.4033 -0.4538 0.1016;0.5866 -0.1728 0.0298 0.6778 -0.5016 -0.5913 0.3952;-0.2742 0.5104
0.6778 -0.8593 0.2544 -0.2142 -0.6960;-0.4289 0.4033 -0.5016 0.2544 -0.4398 -0.2775 0.6419;-
0.1522 -0.4538 -0.5913 -0.2142 -0.2775 -0.2414 0.2747;-0.3860 0.1016 0.3952 -0.6960 0.6419
0.2747 -0.0551]

R2=[-1.0398 0.2792 0.7104 0.7127 -0.5702 0.2367 0.5058;0.2792 0.2710 -0.2394 0.1949 0.0736
0.1248 -0.1780;0.7104 -0.2394 0.4366 -0.4932 -0.1468 0.2032 -0.2006;0.7127 0.1949 -0.4932 -
1.1545 0.8891 0.1330 0.1756;-0.5702 0.0736 -0.1468 0.8891 -0.8176 -0.5234 -0.7315;0.2367
0.1248 0.2032 0.1330 -0.5234 0.6071 0.4337;0.5058 -0.1780 -0.2006 0.1756 -0.7315 0.4337
0.4159]

R3=[0.2650 -0.6571 0.3182 0.0624 -0.4318 -0.2443 -0.3494;-0.6571 -0.6530 0.2887 -0.2096
0.4505 0.8386 0.6192;0.3182 0.2887 -1.2962 0.3798 0.0831 -0.1712 -0.3214;0.0624 -0.2096
0.3798 0.5542 -0.3521 -0.2812 0.3348;-0.4318 0.4505 0.0831 -0.3521 -1.2666 0.1231 -0.5645;-
0.2443 0.8386 -0.1712 -0.2812 0.1231 -0.9325 -0.3675;-0.3494 0.6192 -0.3214 0.3348 -0.5645 -
0.3675 -0.9726]

Benders Method is applied to the BMI problem

The method lasts 8.0581 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.4576 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8151 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 5 in this batch has the following matrices (Rs)

R1=[-1.0121 0.7855 -0.3657 -0.1005 0.1816 0.4806 -0.2970;0.7855 -1.2892 0.0144 -0.0659
0.1373 0.0644 -0.0514;-0.3657 0.0144 0.3917 -0.1897 -0.5449 -0.3492 -0.1196;-0.1005 -0.0659
-0.1897 0.1290 -0.4589 -0.1219 -0.0321;0.1816 0.1373 -0.5449 -0.4589 -0.3657 0.0806 -
0.5670;0.4806 0.0644 -0.3492 -0.1219 0.0806 0.1638 -0.4820;-0.2970 -0.0514 -0.1196 -0.0321 -
0.5670 -0.4820 -0.7774]

R2=[-0.6686 0.2899 -0.9336 0.2683 0.7663 0.2615 0.0078;0.2899 -0.2676 -0.3714 0.3384
0.0000 0.2408 0.1225;-0.9336 -0.3714 -1.2393 -0.4274 0.3698 -0.0028 -0.1884;0.2683 0.3384 -
0.4274 -0.9446 -0.1896 -0.6445 0.3930;0.7663 0.0000 0.3698 -0.1896 -0.6579 -0.4538 -
0.4204;0.2615 0.2408 -0.0028 -0.6445 -0.4538 -1.0040 0.3352;0.0078 0.1225 -0.1884 0.3930 -
0.4204 0.3352 0.0492]

R3=[0.4792 -0.3088 0.1724 -0.5550 -0.5438 -0.2867 0.6312;-0.3088 -0.3512 -0.1015 0.7362
0.2685 0.6074 -0.3638;0.1724 -0.1015 0.3964 -0.0273 -0.2960 0.0541 0.1368;-0.5550 0.7362 -
0.0273 -0.5056 -0.2571 0.4746 -0.7687;-0.5438 0.2685 -0.2960 -0.2571 0.4596 0.1940 -0.1188;-
0.2867 0.6074 0.0541 0.4746 0.1940 -1.0430 0.3165;0.6312 -0.3638 0.1368 -0.7687 -0.1188
0.3165 0.0442]

Benders Method is applied to the BMI problem

The method lasts 5.3408 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.1615 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8407 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 6 in this batch has the following matrices (Rs)

R1=[-0.3051 -0.7750 -0.3601 0.2262 0.2126 -0.3281 -0.1996;-0.7750 -0.7463 0.7529 -0.8349
0.6564 -0.1641 0.7208;-0.3601 0.7529 -1.1395 0.7887 0.2822 0.0516 -0.4095;0.2262 -0.8349
0.7887 -0.2836 -0.0355 0.5167 0.0635;0.2126 0.6564 0.2822 -0.0355 -0.8922 -0.2598 -0.5526;-
0.3281 -0.1641 0.0516 0.5167 -0.2598 -0.1754 0.5572;-0.1996 0.7208 -0.4095 0.0635 -0.5526
0.5572 -0.4086]

R2=[-0.4763 0.3038 0.5060 -0.4066 0.2455 0.1920 -0.1602;0.3038 -0.9665 0.2608 0.7027 -
0.9733 -0.0603 0.2627;0.5060 0.2608 0.6484 0.4120 0.0440 -0.4746 -0.6154;-0.4066 0.7027
0.4120 -0.6039 0.6092 -0.2763 -0.0829;0.2455 -0.9733 0.0440 0.6092 0.1141 -0.2462 -
0.5578;0.1920 -0.0603 -0.4746 -0.2763 -0.2462 0.4262 -0.3309;-0.1602 0.2627 -0.6154 -0.0829
-0.5578 -0.3309 -0.9360]

R3=[-0.1890 0.5791 -0.4758 0.5405 0.6351 -0.2281 -0.2822;0.5791 -0.4028 -0.2744 0.0495
0.5572 0.1557 0.2742;-0.4758 -0.2744 0.0553 -0.1651 0.0155 -0.0699 0.2186;0.5405 0.0495 -
0.1651 0.6592 0.3450 0.2095 0.3135;0.6351 0.5572 0.0155 0.3450 -0.4331 -0.0751 0.5409;-
0.2281 0.1557 -0.0699 0.2095 -0.0751 0.6623 0.1799;-0.2822 0.2742 0.2186 0.3135 0.5409
0.1799 -0.8759]

Benders Method is applied to the BMI problem

The method lasts 8.0092 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.8898 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8404 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[0.4439 0.0924 -0.2631 0.6228 0.1755 -0.0022 0.1351;0.0924 -0.0858 -0.3049 -0.6453 -0.0424 -0.5564 0.0060;-0.2631 -0.3049 -0.0561 -0.5114 0.1319 -0.6705 0.3996;0.6228 -0.6453 -0.5114 -0.8007 -0.2145 -0.1798 0.3064;0.1755 -0.0424 0.1319 -0.2145 -0.4030 -0.3082 0.2100;-0.0022 -0.5564 -0.6705 -0.1798 -0.3082 -0.4474 -0.5226;0.1351 0.0060 0.3996 0.3064 0.2100 -0.5226 0.6388]

R2=[-0.9484 -0.4375 -0.1051 0.0434 0.2334 0.4726 -0.5843;-0.4375 -0.6356 -0.2589 -0.6735 0.4895 -0.6755 0.0098;-0.1051 -0.2589 0.0578 0.0208 -0.2065 0.2769 -0.4122;0.0434 -0.6735

0.0208 0.5137 -0.7223 0.1749 -0.4372;0.2334 0.4895 -0.2065 -0.7223 0.6869 0.2518 -
0.1679;0.4726 -0.6755 0.2769 0.1749 0.2518 -0.9590 0.1085;-0.5843 0.0098 -0.4122 -0.4372 -
0.1679 0.1085 -1.2928]

R3=[-1.0805 0.0363 -0.0081 0.1616 0.2615 -0.3064 0.3518;0.0363 0.2189 0.2122 0.0793 -
0.5617 -0.2173 0.1876;-0.0081 0.2122 -0.4301 0.7754 0.3065 0.1734 0.4560;0.1616 0.0793
0.7754 -0.1183 0.0180 -0.0618 -0.1924;0.2615 -0.5617 0.3065 0.0180 0.3076 0.1657 0.0066;-
0.3064 -0.2173 0.1734 -0.0618 0.1657 0.2591 0.7543;0.3518 0.1876 0.4560 -0.1924 0.0066
0.7543 -0.0938]

Benders Method is applied to the BMI problem

The method lasts 5.3035 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.2602 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.9449 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 8 in this batch has the following matrices (Rs)

R1=[0.1102 0.2097 0.3873 0.1547 -0.4207 -0.8976 -0.3547;0.2097 -0.7032 0.3309 0.0104 -0.2703 0.4072 -0.4037;0.3873 0.3309 -1.2291 -0.1778 0.3608 -0.6965 0.0642;0.1547 0.0104 -0.1778 -0.9087 0.0765 -0.4451 -0.1262;-0.4207 -0.2703 0.3608 0.0765 -1.2067 -0.0530 0.8912;-0.8976 0.4072 -0.6965 -0.4451 -0.0530 -1.2267 -0.2029;-0.3547 -0.4037 0.0642 -0.1262 0.8912 -0.2029 -0.5559]

R2=[-0.4452 -0.2516 0.0107 -0.6629 0.5080 -0.6478 -0.4427;-0.2516 0.2108 -0.0417 -0.1689 -0.1412 0.1203 0.0823;0.0107 -0.0417 -0.0777 -0.3927 -0.0708 0.2939 0.3512;-0.6629 -0.1689 -0.3927 0.6265 0.0524 -0.6177 -0.2414;0.5080 -0.1412 -0.0708 0.0524 -0.8299 -0.1333 0.0925;-0.6478 0.1203 0.2939 -0.6177 -0.1333 0.5472 -0.2328;-0.4427 0.0823 0.3512 -0.2414 0.0925 -0.2328 -0.8381]

R3=[0.0074 -0.6059 -0.1452 -0.0487 0.8331 0.2601 -0.2613;-0.6059 0.2837 0.3159 0.1827 -0.1547 -0.1197 -0.3324;-0.1452 0.3159 0.2596 -0.1471 0.2364 0.6748 0.1831;-0.0487 0.1827 -0.1471 -0.2201 -0.1067 -0.4188 -0.4554;0.8331 -0.1547 0.2364 -0.1067 0.0525 0.0711 0.0031;0.2601 -0.1197 0.6748 -0.4188 0.0711 -1.1565 0.3535;-0.2613 -0.3324 0.1831 -0.4554 0.0031 0.3535 -0.7282]

Benders Method is applied to the BMI problem

The method lasts 8.0979 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.8783 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8218 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 9 in this batch has the following matrices (Rs)

R1=[-0.7012 -0.2562 -0.8379 0.0044 0.1145 -0.2171 -0.0585;-0.2562 -0.8656 0.1413 0.2999 -
0.1321 -0.2042 0.1194;-0.8379 0.1413 -1.0138 0.0907 0.0463 -0.2749 -0.2326;0.0044 0.2999
0.0907 0.1128 0.5878 -0.8171 0.6920;0.1145 -0.1321 0.0463 0.5878 -0.9036 0.0971 0.1019;-
0.2171 -0.2042 -0.2749 -0.8171 0.0971 -0.9304 -0.2832;-0.0585 0.1194 -0.2326 0.6920 0.1019 -
0.2832 0.2961]

R2=[-0.7760 -0.0516 0.4627 0.2636 0.0129 -0.1610 -0.5770;-0.0516 0.2985 -0.3101 0.0147
0.3981 -0.6997 0.1895;0.4627 -0.3101 0.6213 0.2546 0.1931 -0.1261 -0.6474;0.2636 0.0147
0.2546 -1.2690 -0.5394 0.2588 -0.6846;0.0129 0.3981 0.1931 -0.5394 0.1378 -0.0231 0.0945;-
0.1610 -0.6997 -0.1261 0.2588 -0.0231 -0.6358 0.4364;-0.5770 0.1895 -0.6474 -0.6846 0.0945
0.4364 -0.2326]

R3=[-1.0979 -0.5198 0.4293 -0.4156 -0.5363 -0.1931 0.1516;-0.5198 0.2153 -0.2811 0.1270
0.0431 0.4133 0.1065;0.4293 -0.2811 0.6966 -0.3947 0.4072 -0.0132 0.7279;-0.4156 0.1270 -
0.3947 0.3424 -0.4847 0.6267 0.8538;-0.5363 0.0431 0.4072 -0.4847 0.5468 0.5046 -0.7852;-
0.1931 0.4133 -0.0132 0.6267 0.5046 -0.8296 -0.0109;0.1516 0.1065 0.7279 0.8538 -0.7852 -
0.0109 -1.2838]

Benders Method is applied to the BMI problem

The method lasts 8.1685 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.7851 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8567 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[0.3811 0.5768 0.7670 -0.8478 -0.0748 0.5821 -0.1320;0.5768 -0.1986 -0.1543 0.1165
0.0268 -0.2552 0.2021;0.7670 -0.1543 -0.3529 0.0832 -0.0092 0.5215 0.3692;-0.8478 0.1165
0.0832 -1.0932 0.2355 -0.6408 -0.2967;-0.0748 0.0268 -0.0092 0.2355 -0.9903 0.2436
0.0158;0.5821 -0.2552 0.5215 -0.6408 0.2436 -0.8891 -0.6958;-0.1320 0.2021 0.3692 -0.2967
0.0158 -0.6958 -0.1303]

R2=[0.4019 -0.1922 -0.5326 -0.3228 0.0786 -0.0851 0.0186;-0.1922 0.2906 -0.1047 0.7896
0.1046 -0.1029 -0.1459;-0.5326 -0.1047 0.1464 -0.5059 -0.3099 -0.5930 0.0560;-0.3228 0.7896
-0.5059 -1.0031 -0.1379 -0.6817 0.4703;0.0786 0.1046 -0.3099 -0.1379 0.6398 -0.2681 0.5587;-
0.0851 -0.1029 -0.5930 -0.6817 -0.2681 0.6132 0.0926;0.0186 -0.1459 0.0560 0.4703 0.5587
0.0926 0.1829]

R3=[0.1788 -0.2601 0.1890 0.0407 -0.0881 0.7900 0.2102;-0.2601 -0.2127 -0.6301 -0.2939
0.3337 -0.3036 0.5349;0.1890 -0.6301 -0.7823 0.0166 0.5930 0.6377 -0.2127;0.0407 -0.2939
0.0166 0.3313 0.3662 0.7647 0.3822;-0.0881 0.3337 0.5930 0.3662 -0.7572 -0.2633 -
0.0816;0.7900 -0.3036 0.6377 0.7647 -0.2633 -0.9074 -0.5562;0.2102 0.5349 -0.2127 0.3822 -
0.0816 -0.5562 -0.6732]

Benders Method is applied to the BMI problem

The method lasts 10.9654 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.2140 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8700 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

From here, 10 BMIs in the batch related to $n=7$ and $r=4$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

$R1 = [-0.0384 \ 0.7700 \ -0.7109 \ -0.1592 \ 0.0519 \ -0.2759 \ -0.0682; 0.7700 \ -0.7479 \ -0.0531 \ 0.8118$
 $0.0216 \ -0.2095 \ -0.2719; -0.7109 \ -0.0531 \ 0.3548 \ 0.0132 \ 0.2156 \ 0.5364 \ 0.0847; -0.1592 \ 0.8118$
 $0.0132 \ -0.5628 \ -0.2680 \ -0.3977 \ 0.4287; 0.0519 \ 0.0216 \ 0.2156 \ -0.2680 \ -1.0682 \ 0.1950 \ 0.2353; -$
 $0.2759 \ -0.2095 \ 0.5364 \ -0.3977 \ 0.1950 \ -0.1589 \ 0.1660; -0.0682 \ -0.2719 \ 0.0847 \ 0.4287 \ 0.2353$
 $0.1660 \ 0.2058]$

R2=[-1.1036 -0.9485 0.1678 0.2415 0.0839 -0.9888 -0.3711;-0.9485 -1.1598 0.3137 0.5567 0.3644 0.6570 -0.1197;0.1678 0.3137 0.3013 -0.4591 0.1276 -0.0972 0.4152;0.2415 0.5567 -0.4591 0.4656 -0.1380 0.0438 0.0395;0.0839 0.3644 0.1276 -0.1380 -0.1633 -0.5606 -0.3238;-0.9888 0.6570 -0.0972 0.0438 -0.5606 -1.2226 -0.0549;-0.3711 -0.1197 0.4152 0.0395 -0.3238 -0.0549 -0.6113]

R3=[0.6235 0.0153 -0.7671 -0.5524 0.4211 0.0135 0.0657;0.0153 -0.7227 -0.1963 0.0376 0.4002 0.2531 0.4668;-0.7671 -0.1963 -0.2624 -0.0914 -0.1341 -0.1940 0.1207;-0.5524 0.0376 -0.0914 0.2146 -0.0126 -0.6151 -0.7618;0.4211 0.4002 -0.1341 -0.0126 -0.7275 -0.0346 -0.1618;0.0135 0.2531 -0.1940 -0.6151 -0.0346 -0.1518 0.3930;0.0657 0.4668 0.1207 -0.7618 -0.1618 0.3930 -0.9562]

R4=[-0.9158 -0.1668 -0.0450 0.2633 0.7339 -0.7976 0.0175;-0.1668 -1.2026 0.3925 0.8668 -0.0088 0.0947 -0.0628;-0.0450 0.3925 -0.4963 0.6577 -0.3210 0.3986 0.7450;0.2633 0.8668 0.6577 0.1672 -0.0728 0.7021 0.4067;0.7339 -0.0088 -0.3210 -0.0728 -1.0431 0.1409 -0.0515;-0.7976 0.0947 0.3986 0.7021 0.1409 -0.6193 -0.0805;0.0175 -0.0628 0.7450 0.4067 -0.0515 -0.0805 -0.3131]

Benders Method is applied to the BMI problem

The method lasts 11.1568 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.1820 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8926 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[-1.1256 -0.2481 -0.1398 -0.2718 -0.2380 0.7958 -0.0081;-0.2481 -0.9647 0.1964 -0.7782 -0.1382 0.7802 -0.0976;-0.1398 0.1964 -1.0213 -0.8607 -0.2001 -0.4952 0.7582;-0.2718 -0.7782 -0.8607 -0.6679 -0.0420 -0.3473 0.5897;-0.2380 -0.1382 -0.2001 -0.0420 -0.7880 -0.0367 0.7673;0.7958 0.7802 -0.4952 -0.3473 -0.0367 0.6866 0.5163;-0.0081 -0.0976 0.7582 0.5897 0.7673 0.5163 0.6199]

R2=[-0.7882 -0.1340 0.2844 0.2550 0.1336 0.0458 -0.1652;-0.1340 -1.1598 -0.4763 -0.6130 0.8128 0.2133 -0.6021;0.2844 -0.4763 0.3555 -0.1318 -0.0470 0.2507 0.6246;0.2550 -0.6130 -0.1318 -0.9659 0.3369 0.1179 -0.5256;0.1336 0.8128 -0.0470 0.3369 -0.4838 -0.2788 -0.0038;0.0458 0.2133 0.2507 0.1179 -0.2788 -1.0724 -0.4000;-0.1652 -0.6021 0.6246 -0.5256 -0.0038 -0.4000 0.5222]

R3=[-0.8702 -0.0947 -0.3903 0.1700 0.1988 -0.0941 0.2869;-0.0947 -0.1099 -0.2389 0.4404 0.2589 -0.0512 -0.0593;-0.3903 -0.2389 -0.9263 -0.1176 -0.7848 0.1628 0.2481;0.1700 0.4404 -0.1176 -1.2289 0.2535 -0.0083 -0.0137;0.1988 0.2589 -0.7848 0.2535 0.6377 -0.5771 -0.3371;-0.0941 -0.0512 0.1628 -0.0083 -0.5771 -1.2620 0.5748;0.2869 -0.0593 0.2481 -0.0137 -0.3371 0.5748 -0.2156]

R4=[0.4713 0.1213 0.0929 -0.1548 -0.7038 -0.1800 -0.6977;0.1213 -0.0628 0.0138 -0.5443 -0.4393 0.2300 0.5842;0.0929 0.0138 -0.9216 -0.6604 0.6282 0.4841 0.3307;-0.1548 -0.5443 -0.6604 -1.2316 -0.0670 0.2347 -0.1587;-0.7038 -0.4393 0.6282 -0.0670 -0.7588 0.3723 0.3734;-0.1800 0.2300 0.4841 0.2347 0.3723 -0.6081 0.0720;-0.6977 0.5842 0.3307 -0.1587 0.3734 0.0720 0.3313]

Benders Method is applied to the BMI problem

The method lasts 11.2593 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.6301 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8704 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 3 in this batch has the following matrices (Rs)

R1=[-0.8654 -0.0287 -0.3228 -0.1240 0.6159 0.0233 -0.8118;-0.0287 -1.1662 -0.0401 0.0943
0.0201 -0.2046 0.8692;-0.3228 -0.0401 0.6032 0.5689 0.1978 0.6183 -0.0325;-0.1240 0.0943
0.5689 0.5864 0.2227 0.1102 -0.4116;0.6159 0.0201 0.1978 0.2227 -1.2847 -0.4610 -
0.3385;0.0233 -0.2046 0.6183 0.1102 -0.4610 -0.0202 0.1215;-0.8118 0.8692 -0.0325 -0.4116 -
0.3385 0.1215 0.1308]

R2=[-0.9766 0.1516 0.1011 0.2235 -0.1183 0.3264 -0.2957;0.1516 -0.6527 -0.4371 0.1294
0.2016 -0.4341 -0.1148;0.1011 -0.4371 -1.2792 -0.0197 -0.0378 0.0400 -0.5886;0.2235 0.1294 -
0.0197 -0.2525 0.6290 0.0493 0.6394;-0.1183 0.2016 -0.0378 0.6290 -0.4747 0.6527
0.4218;0.3264 -0.4341 0.0400 0.0493 0.6527 0.0073 0.0381;-0.2957 -0.1148 -0.5886 0.6394
0.4218 0.0381 -0.4278]

R3=[-0.1883 0.2559 -0.2969 -0.1501 0.6506 -0.0528 -0.0962;0.2559 0.5945 -0.2324 0.2236 -
0.6689 0.4629 0.1804;-0.2969 -0.2324 -0.8628 -0.4498 -0.4743 -0.2752 -0.3405;-0.1501 0.2236
-0.4498 -0.6800 -0.0931 -0.5903 0.0509;0.6506 -0.6689 -0.4743 -0.0931 -0.2620 -0.3803

0.2207;-0.0528 0.4629 -0.2752 -0.5903 -0.3803 -0.6179 -0.3349;-0.0962 0.1804 -0.3405 0.0509
0.2207 -0.3349 -1.2872]

R4=[-0.7567 0.0318 0.9388 0.0283 -0.1158 -0.1406 0.1872;0.0318 -1.2228 0.3303 -0.0685
0.0977 0.2851 -0.5508;0.9388 0.3303 -0.0204 0.9396 -0.0283 0.3826 -0.5225;0.0283 -0.0685
0.9396 -0.1804 0.2285 -0.6402 -0.4287;-0.1158 0.0977 -0.0283 0.2285 -0.7591 -0.1401 -
0.3027;-0.1406 0.2851 0.3826 -0.6402 -0.1401 -0.1965 0.3043;0.1872 -0.5508 -0.5225 -0.4287 -
0.3027 0.3043 -0.8133]

Benders Method is applied to the BMI problem

The method lasts 8.3388 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.7506 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8117 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 4 in this batch has the following matrices (Rs)

R1=[0.4128 0.4514 -0.0657 -0.6632 -0.6395 -0.1051 0.0550;0.4514 -0.2393 0.8307 0.6711
0.1204 0.2854 0.0022;-0.0657 0.8307 -0.8952 0.3659 0.5335 0.0915 0.6052;-0.6632 0.6711
0.3659 0.4359 -0.2754 -0.0615 -0.4111;-0.6395 0.1204 0.5335 -0.2754 -0.5313 0.0488 -0.5024;-
0.1051 0.2854 0.0915 -0.0615 0.0488 -0.5607 0.1366;0.0550 0.0022 0.6052 -0.4111 -0.5024
0.1366 0.1571]

R2=[-1.0091 0.3542 0.4378 -0.3429 0.1713 -0.7721 -0.0533;0.3542 -0.8274 0.1352 0.2363
0.1254 -0.6614 -0.0234;0.4378 0.1352 0.6797 -0.1259 0.0703 0.5230 -0.3428;-0.3429 0.2363 -
0.1259 -1.1057 -0.7116 0.2071 0.4339;0.1713 0.1254 0.0703 -0.7116 -0.3359 -0.2323 0.1492;-
0.7721 -0.6614 0.5230 0.2071 -0.2323 -0.9925 -0.1056;-0.0533 -0.0234 -0.3428 0.4339 0.1492 -
0.1056 -0.8201]

R3=[0.5162 -0.1911 0.1419 -0.6470 0.7911 -0.4175 0.7110;-0.1911 -0.1040 -0.6466 -0.2069 -
0.2226 -0.2519 -0.6411;0.1419 -0.6466 -0.6644 -0.5818 0.4646 0.1296 0.0352;-0.6470 -0.2069 -
0.5818 -0.0669 -0.2660 0.1103 -0.2759;0.7911 -0.2226 0.4646 -0.2660 -1.2178 0.1241 -0.0881;-
0.4175 -0.2519 0.1296 0.1103 0.1241 -0.6705 0.3971;0.7110 -0.6411 0.0352 -0.2759 -0.0881
0.3971 0.3717]

R4=[0.5137 -0.3453 0.1618 -0.4619 0.5710 -0.2474 -0.0002;-0.3453 -0.3062 -0.1543 0.7900
0.3162 0.0934 -0.7030;0.1618 -0.1543 0.1092 0.3164 -0.0446 0.3152 0.9244;-0.4619 0.7900
0.3164 -0.8774 -0.2710 0.0086 -0.2382;0.5710 0.3162 -0.0446 -0.2710 0.2743 0.7297 -0.7949;-
0.2474 0.0934 0.3152 0.0086 0.7297 -0.9661 -0.2442;-0.0002 -0.7030 0.9244 -0.2382 -0.7949 -
0.2442 -0.3123]

Benders Method is applied to the BMI problem

The method lasts 8.2325 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.3191 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8793 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 5 in this batch has the following matrices (Rs)

R1=[-0.3136 0.7676 0.1349 0.3470 -0.1006 -0.1657 -0.5810;0.7676 -1.1993 -0.3860 0.0328 -0.1734 -0.6234 0.1923;0.1349 -0.3860 0.6860 0.2614 0.6918 0.0632 0.4110;0.3470 0.0328 0.2614 -0.0260 0.4168 -0.0384 -0.0170;-0.1006 -0.1734 0.6918 0.4168 -0.9946 -0.1735 -0.2594;-0.1657 -0.6234 0.0632 -0.0384 -0.1735 -1.0279 0.6428;-0.5810 0.1923 0.4110 -0.0170 -0.2594 0.6428 -0.8562]

R2=[0.5066 0.3265 -0.6803 -0.2420 0.5405 0.2477 -0.2919;0.3265 -0.0428 0.0814 0.6780 0.2117 -0.0107 0.1393;-0.6803 0.0814 0.3392 -0.1695 -0.4843 -0.4011 0.1644;-0.2420 0.6780 -0.1695 0.6893 -0.1295 0.3735 -0.8636;0.5405 0.2117 -0.4843 -0.1295 -0.0593 0.4451 -0.1860;0.2477 -0.0107 -0.4011 0.3735 0.4451 0.6165 0.0092;-0.2919 0.1393 0.1644 -0.8636 -0.1860 0.0092 0.0651]

R3=[0.2345 -0.2207 -0.0147 0.7103 0.8181 0.4922 0.1478;-0.2207 -0.1336 0.5560 -0.4418 0.4848 0.0734 0.6023;-0.0147 0.5560 0.2863 0.6492 0.5409 -0.4590 -0.4963;0.7103 -0.4418 0.6492 -1.0719 -0.6605 0.1882 0.0544;0.8181 0.4848 0.5409 -0.6605 0.1402 0.1101 -0.0040;0.4922 0.0734 -0.4590 0.1882 0.1101 -0.0600 0.4320;0.1478 0.6023 -0.4963 0.0544 -0.0040 0.4320 0.6765]

R4=[-0.0976 0.2517 -0.3589 -0.3538 -0.2763 -0.7335 -0.2000;0.2517 -0.6346 -0.4012 0.7864 -0.1478 0.5111 0.7666;-0.3589 -0.4012 0.6906 -0.7055 -0.0197 -0.1464 0.3560;-0.3538 0.7864 -0.7055 -0.8167 -0.2363 0.3594 0.0864;-0.2763 -0.1478 -0.0197 -0.2363 -0.6493 -0.5133 0.4812;-0.7335 0.5111 -0.1464 0.3594 -0.5133 0.0628 -0.1171;-0.2000 0.7666 0.3560 0.0864 0.4812 -0.1171 -0.5866]

Benders Method is applied to the BMI problem

The method lasts 5.3564 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.7536 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8354 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 6 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -1.0152 & 0.3591 & 0.1171 & 0.5201 & 0.4992 & -0.4075 & 0.2602 \\ 0.3591 & 0.2415 & 0.7800 & -0.6504 & 0.4610 & -0.1179 & 0.1436 \\ 0.1171 & 0.7800 & 0.6810 & -0.1762 & -0.5127 & 0.0799 & -0.4515 \\ 0.5201 & -0.6504 & -0.1762 & 0.4968 & 0.5735 & 0.5790 & -0.3011 \\ 0.4992 & 0.4610 & -0.5127 & 0.5735 & 0.1533 & 0.0355 & 0.6323 \\ -0.4075 & -0.1179 & 0.0799 & 0.5790 & 0.0355 & 0.4396 & 0.0161 \\ 0.2602 & 0.1436 & -0.4515 & -0.3011 & 0.6323 & 0.0161 & -0.6375 \end{bmatrix}$

R2=[-0.6175 0.1070 0.0044 0.1113 -0.2493 -0.7923 0.0657;0.1070 0.6066 0.1221 0.2046 0.4164 0.5340 0.2626;0.0044 0.1221 0.2410 -0.2427 -0.0267 -0.0018 -0.3242;0.1113 0.2046 -0.2427 -0.0522 -0.1121 -0.5253 0.1261;-0.2493 0.4164 -0.0267 -0.1121 -0.4732 -0.5682 -0.3729;-0.7923 0.5340 -0.0018 -0.5253 -0.5682 -1.2982 0.3386;0.0657 0.2626 -0.3242 0.1261 -0.3729 0.3386 0.2006]

R3=[-0.0874 -0.1450 -0.2998 0.2948 -0.3178 0.0905 0.0124;-0.1450 0.4644 -0.0976 0.2096 -0.0122 0.4910 -0.0518;-0.2998 -0.0976 -0.1764 0.2940 0.0357 0.3763 -0.0700;0.2948 0.2096 0.2940 -1.1092 -0.5934 0.6922 0.0202;-0.3178 -0.0122 0.0357 -0.5934 0.3177 0.4705 0.2108;0.0905 0.4910 0.3763 0.6922 0.4705 -0.1133 0.3945;0.0124 -0.0518 -0.0700 0.0202 0.2108 0.3945 -0.2097]

R4=[0.1062 -0.0832 -0.0417 0.6704 -0.3409 0.3208 -0.2756;-0.0832 -1.0552 -0.6637 0.1681 -0.1726 -0.6665 -0.0060;-0.0417 -0.6637 0.5045 0.3870 -0.0186 0.2378 0.7776;0.6704 0.1681 0.3870 -0.0345 -0.0832 0.4033 -0.2355;-0.3409 -0.1726 -0.0186 -0.0832 -0.6273 0.0138 -0.1470;0.3208 -0.6665 0.2378 0.4033 0.0138 0.0564 -0.2084;-0.2756 -0.0060 0.7776 -0.2355 -0.1470 -0.2084 -0.2957]

Benders Method is applied to the BMI problem

The method lasts 5.4305 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.9258 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8717 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[0.4798 -0.0652 0.5350 -0.4909 -0.1817 -0.5597 0.2903;-0.0652 -1.0180 0.4449 0.1459 -0.6717 -0.0639 0.9051;0.5350 0.4449 -0.9054 0.2889 -0.1974 -0.4645 -0.7312;-0.4909 0.1459 0.2889 -0.3814 -0.6271 0.6079 -0.9813;-0.1817 -0.6717 -0.1974 -0.6271 0.5133 0.6263 -0.1948;-0.5597 -0.0639 -0.4645 0.6079 0.6263 -0.9792 0.0493;0.2903 0.9051 -0.7312 -0.9813 -0.1948 0.0493 -0.8683]

R2=[0.3756 -0.1437 -0.1067 0.2835 -0.1813 -0.5447 -0.5568;-0.1437 -0.3875 0.2816 -0.4926 0.1409 -0.0702 -0.3640;-0.1067 0.2816 -1.0462 0.3114 -0.9055 -0.5332 -0.6643;0.2835 -0.4926 0.3114 0.6089 -0.0745 -0.6989 0.1985;-0.1813 0.1409 -0.9055 -0.0745 -0.4944 -0.1185 0.3589;-0.5447 -0.0702 -0.5332 -0.6989 -0.1185 0.6318 -0.3127;-0.5568 -0.3640 -0.6643 0.1985 0.3589 -0.3127 0.3559]

R3=[-0.9605 -0.0932 -0.6780 -0.2848 0.0868 -0.1926 -0.1164;-0.0932 0.4008 0.1259 -0.1688 0.3639 -0.3254 -0.2392;-0.6780 0.1259 -0.1016 -0.4083 0.4492 -0.5271 -0.3054;-0.2848 -0.1688 -0.4083 -1.0581 0.0790 0.1836 0.3613;0.0868 0.3639 0.4492 0.0790 0.5497 0.2708 0.6398;-0.1926 -0.3254 -0.5271 0.1836 0.2708 -1.2815 0.1988;-0.1164 -0.2392 -0.3054 0.3613 0.6398 0.1988 -0.7580]

R4=[-0.1313 -0.3060 0.3839 0.6034 0.1454 -0.1536 0.2213;-0.3060 -1.1093 0.4620 -0.1183 0.5902 0.1205 0.3071;0.3839 0.4620 -0.5912 -0.6490 0.1025 -0.0590 -0.1981;0.6034 -0.1183 -0.6490 0.5007 -0.3505 0.5394 -0.4094;0.1454 0.5902 0.1025 -0.3505 0.6548 -0.0065 0.6159;-0.1536 0.1205 -0.0590 0.5394 -0.0065 -1.1136 0.3210;0.2213 0.3071 -0.1981 -0.4094 0.6159 0.3210 -0.4826]

Benders Method is applied to the BMI problem

The method lasts 8.2729 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.0321 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.9838 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 8 in this batch has the following matrices (Rs)

R1=[-0.1994 0.3762 -0.0827 -0.7975 -0.3313 -0.6079 0.8545;0.3762 0.5122 0.0059 0.4343
0.1856 -0.0999 -0.4194;-0.0827 0.0059 -0.8139 -0.1214 0.3235 -0.1707 -0.5579;-0.7975 0.4343
-0.1214 0.4155 0.3476 -0.0762 -0.4258;-0.3313 0.1856 0.3235 0.3476 -0.6470 -0.9221 -0.0818;-
0.6079 -0.0999 -0.1707 -0.0762 -0.9221 0.4757 -0.3839;0.8545 -0.4194 -0.5579 -0.4258 -0.0818
-0.3839 -0.3895]

R2=[-0.6805 -0.3928 -0.0645 0.1710 -0.5508 0.3467 0.6324;-0.3928 -0.9789 -0.1247 0.7135 -
0.0726 0.5062 0.4879;-0.0645 -0.1247 0.1751 0.0189 0.7383 -0.2289 0.1564;0.1710 0.7135
0.0189 0.3517 -0.1693 -0.4737 -0.3232;-0.5508 -0.0726 0.7383 -0.1693 0.2558 -0.0949
0.0117;0.3467 0.5062 -0.2289 -0.4737 -0.0949 -0.7680 -0.3646;0.6324 0.4879 0.1564 -0.3232
0.0117 -0.3646 0.1085]

R3=[-0.8966 -0.3841 0.1037 -0.2941 -0.0517 -0.0371 -0.0074;-0.3841 0.3780 -0.0880 -0.4085 -
0.3146 -0.4576 0.2211;0.1037 -0.0880 -1.1193 -0.0762 -0.0325 -0.2569 -0.5416;-0.2941 -0.4085
-0.0762 -0.5166 0.6947 -0.2906 0.4194;-0.0517 -0.3146 -0.0325 0.6947 -0.6145 0.4315 -

0.3371;-0.0371 -0.4576 -0.2569 -0.2906 0.4315 0.5198 -0.6153;-0.0074 0.2211 -0.5416 0.4194 -
0.3371 -0.6153 -0.4387]

R4=[-0.9941 0.3386 0.1223 0.0654 -0.6104 0.4183 0.1200;0.3386 0.0442 -0.6315 -0.4237 -
0.3315 0.1586 0.7708;0.1223 -0.6315 -1.2617 -0.5905 -0.3795 0.4846 -0.0418;0.0654 -0.4237 -
0.5905 -1.2213 0.5871 0.0050 0.3837;-0.6104 -0.3315 -0.3795 0.5871 -0.9104 -0.1979 -
0.5395;0.4183 0.1586 0.4846 0.0050 -0.1979 0.6150 -0.6275;0.1200 0.7708 -0.0418 0.3837 -
0.5395 -0.6275 -1.1313]

Benders Method is applied to the BMI problem

The method lasts 8.3264 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.1214 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8098 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 9 in this batch has the following matrices (Rs)

R1=[-0.4163 0.7849 -0.6530 -0.0098 0.1148 -0.1261 0.4423;0.7849 -1.2530 -0.5814 -0.6072 -0.6567 0.1416 0.3557;-0.6530 -0.5814 -0.1703 0.7890 -0.0835 -0.2919 -0.0799;-0.0098 -0.6072 0.7890 -1.2894 0.5223 0.1613 0.2951;0.1148 -0.6567 -0.0835 0.5223 0.3395 -0.7083 -0.3757;-0.1261 0.1416 -0.2919 0.1613 -0.7083 -0.2605 0.3389;0.4423 0.3557 -0.0799 0.2951 -0.3757 0.3389 0.1409]

R2=[-0.6973 0.3288 0.1578 0.4241 0.1075 -0.7814 0.5998;0.3288 0.5660 0.0859 -0.1672 0.3126 0.3368 0.2549;0.1578 0.0859 -1.0484 -0.4150 0.4526 -0.1061 0.5645;0.4241 -0.1672 -0.4150 0.5518 -0.7812 0.7633 0.7282;0.1075 0.3126 0.4526 -0.7812 -1.0162 -0.3598 0.4954;-0.7814 0.3368 -0.1061 0.7633 -0.3598 0.0666 0.0227;0.5998 0.2549 0.5645 0.7282 0.4954 0.0227 0.3346]

R3=[0.6294 0.1179 0.0144 0.2722 0.0715 -0.3443 0.3611;0.1179 0.6613 0.1318 -0.7045 -0.2088 -0.5147 -0.0833;0.0144 0.1318 -1.0471 -0.2102 0.4617 0.4159 0.2357;0.2722 -0.7045 -0.2102 0.4127 0.1644 -0.0562 0.0245;0.0715 -0.2088 0.4617 0.1644 0.1043 0.0553 -0.1169;-0.3443 -0.5147 0.4159 -0.0562 0.0553 -1.0619 0.1773;0.3611 -0.0833 0.2357 0.0245 -0.1169 0.1773 -0.9350]

R4=[-0.7715 0.0870 0.0447 0.2880 -0.4937 0.1583 0.3901;0.0870 -0.7130 -0.0266 -0.1004 0.0386 -0.3292 0.1997;0.0447 -0.0266 -1.1182 -0.1568 0.3320 0.5809 0.2614;0.2880 -0.1004 -0.1568 0.5294 0.9310 -0.7320 0.1360;-0.4937 0.0386 0.3320 0.9310 -0.4189 -0.3105 0.0928;0.1583 -0.3292 0.5809 -0.7320 -0.3105 0.4043 0.4741;0.3901 0.1997 0.2614 0.1360 0.0928 0.4741 -0.0516]

Benders Method is applied to the BMI problem

The method lasts 11.2046 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.8741 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8500 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[0.0069 0.3237 -0.4734 -0.1955 -0.0996 -0.0281 -0.1057;0.3237 0.1284 -0.2160 0.1778 -0.4557 -0.2205 0.6023;-0.4734 -0.2160 0.1171 -0.8285 0.3881 0.4468 0.0324;-0.1955 0.1778 -0.8285 -1.1546 -0.3380 0.2289 -0.5069;-0.0996 -0.4557 0.3881 -0.3380 -1.0660 0.0604 -0.2328;-0.0281 -0.2205 0.4468 0.2289 0.0604 -0.7543 -0.2845;-0.1057 0.6023 0.0324 -0.5069 -0.2328 -0.2845 -0.7558]

R2=[-0.2954 -0.0950 -0.1890 -0.1450 -0.0128 -0.2728 -0.0657;-0.0950 -0.1390 -0.2279 -0.6268 0.8866 -0.1901 -0.1373;-0.1890 -0.2279 -0.8512 -0.0493 0.5310 -0.7034 0.0996;-0.1450 -0.6268 -0.0493 -0.0896 -0.3473 0.0821 0.4020;-0.0128 0.8866 0.5310 -0.3473 -0.1724 0.9630 0.1397;-0.2728 -0.1901 -0.7034 0.0821 0.9630 -1.2046 0.3506;-0.0657 -0.1373 0.0996 0.4020 0.1397 0.3506 0.6374]

R3=[-0.2617 -0.0314 -0.2683 0.5010 0.3194 0.0452 -0.1140;-0.0314 0.5143 -0.2480 0.0912 0.6834 0.4477 -0.0639;-0.2683 -0.2480 0.3576 0.2361 -0.6854 -0.1180 0.1252;0.5010 0.0912 0.2361 0.0529 -0.7124 0.1194 0.4347;0.3194 0.6834 -0.6854 -0.7124 -0.9959 0.1533 -0.0730;0.0452 0.4477 -0.1180 0.1194 0.1533 0.0824 -0.0278;-0.1140 -0.0639 0.1252 0.4347 -0.0730 -0.0278 -0.3240]

R4=[0.2016 0.4186 0.0765 -0.7965 0.8100 0.0297 -0.0523;0.4186 -0.5674 -0.5576 0.2976 0.4908 -0.1352 -0.4482;0.0765 -0.5576 -1.1960 -0.3884 0.0928 -0.1022 -0.3125;-0.7965 0.2976 -0.3884 0.4135 -0.3196 0.7062 -0.0630;0.8100 0.4908 0.0928 -0.3196 -0.4360 0.6523 -0.0849;0.0297 -0.1352 -0.1022 0.7062 0.6523 -1.2906 -0.7421;-0.0523 -0.4482 -0.3125 -0.0630 -0.0849 -0.7421 -0.9214]

Benders Method is applied to the BMI problem

The method lasts 8.4370 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.1950 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.8562 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

From here, 10 BMIs in the batch related to $n=8$ and $r=1$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.5583 & 0.5058 & 0.1384 & -0.0185 & 0.1568 & -0.8638 & -0.4349 & -0.7692 \\ 0.5058 & 0.2763 & -0.1144 & -0.4238 & 0.2867 & -0.4339 & 0.7965 & -0.3027 \\ 0.1384 & -0.1144 & -0.6301 & -0.4037 & -0.0738 & 0.1654 & -0.5169 & 0.0019 \\ -0.0185 & -0.4238 & -0.4037 & -0.1598 & -0.1447 & -0.0810 & -0.4352 & -0.3132 \\ 0.1568 & 0.2867 & -0.0738 & -0.1447 & -0.9730 & 0.9117 & -0.2123 & 0.3997 \\ -0.8638 & -0.4339 & 0.1654 & -0.0810 & 0.9117 & -0.5639 & 0.8077 & \end{bmatrix}$

0.1032;-0.4349 0.7965 -0.5169 -0.4352 -0.2123 0.8077 -0.5192 0.3979;-0.7692 -0.3027 0.0019 -
0.3132 0.3997 0.1032 0.3979 0.5337]

Benders Method is applied to the BMI problem

The method lasts 5.5516 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.9053 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.5801 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[-0.2878 -0.1256 0.2855 -0.3872 0.7369 0.2108 0.0686 0.5590;-0.1256 -0.0967 0.4953 -
0.4349 -0.3828 -0.4760 -0.3628 -0.1888;0.2855 0.4953 -0.5925 0.1649 0.2318 0.0274 -0.7489 -
0.2753;-0.3872 -0.4349 0.1649 -0.2401 0.2099 0.8304 0.0227 -0.2114;0.7369 -0.3828 0.2318
0.2099 -0.5756 0.3099 -0.5055 0.2777;0.2108 -0.4760 0.0274 0.8304 0.3099 -0.0486 0.3329

0.1317;0.0686 -0.3628 -0.7489 0.0227 -0.5055 0.3329 -0.8170 -0.1937;0.5590 -0.1888 -0.2753 -
0.2114 0.2777 0.1317 -0.1937 -0.8670]

Benders Method is applied to the BMI problem

The method lasts 3.0803 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.5233 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9476 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 3 in this batch has the following matrices (Rs)

R1=[0.1238 -0.0237 -0.5265 0.0992 0.2678 -0.4170 0.0301 -0.2980;-0.0237 -0.6145 -0.1190 -
0.0869 0.1754 -0.1399 0.2343 0.7327;-0.5265 -0.1190 -0.4157 -0.4756 0.1725 0.1321 -0.2346
0.1265;0.0992 -0.0869 -0.4756 0.6973 0.8168 0.6766 -0.3963 -0.4948;0.2678 0.1754 0.1725
0.8168 0.5650 -0.3757 -0.1182 0.1172;-0.4170 -0.1399 0.1321 0.6766 -0.3757 -1.1412 -0.2346

0.2718;0.0301 0.2343 -0.2346 -0.3963 -0.1182 -0.2346 0.3879 0.4289;-0.2980 0.7327 0.1265 -
0.4948 0.1172 0.2718 0.4289 0.4963]

Benders Method is applied to the BMI problem

The method lasts 2.4007 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.1578 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9612 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 4 in this batch has the following matrices (Rs)

R1=[0.4388 0.0444 0.0018 0.5655 -0.1948 0.5092 -0.6156 0.5668;0.0444 -0.8011 0.0055 -
0.6152 -0.2687 -0.2337 -0.3423 -0.1327;0.0018 0.0055 -0.1033 -0.2169 -0.7035 -0.9258 0.6333
-0.2862;0.5655 -0.6152 -0.2169 0.6661 -0.5653 0.6274 -0.3462 -0.3673;-0.1948 -0.2687 -0.7035
-0.5653 0.5243 0.3716 0.5737 0.4064;0.5092 -0.2337 -0.9258 0.6274 0.3716 -1.1687 -0.2411 -

0.2602;-0.6156 -0.3423 0.6333 -0.3462 0.5737 -0.2411 -0.5604 -0.0397;0.5668 -0.1327 -0.2862
-0.3673 0.4064 -0.2602 -0.0397 0.6348]

Benders Method is applied to the BMI problem

The method lasts 2.4293 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.2668 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.3629 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 5 in this batch has the following matrices (Rs)

R1=[-1.0875 0.0785 -0.3969 -0.0613 0.7275 0.1031 0.2309 -0.0191;0.0785 -1.0743 -0.0363 -
0.6058 -0.1570 0.2011 -0.2799 -0.6283;-0.3969 -0.0363 -0.5077 0.5109 -0.2896 -0.5666 -0.2090
-0.6453;-0.0613 -0.6058 0.5109 -1.1436 -0.9017 -0.6267 -0.1056 -0.0644;0.7275 -0.1570 -
0.2896 -0.9017 -0.3166 -0.4814 0.5677 -0.4745;0.1031 0.2011 -0.5666 -0.6267 -0.4814 0.2301 -

0.5694 0.0097;0.2309 -0.2799 -0.2090 -0.1056 0.5677 -0.5694 -0.8532 0.1535;-0.0191 -0.6283 -
0.6453 -0.0644 -0.4745 0.0097 0.1535 -0.6276]

Benders Method is applied to the BMI problem

The method lasts 4.1942 seconds

The method found a feasible solution given in the following

X=[0.5440 0.0071 -0.0487 -0.0517 0.0842 0.0026 0.0373 -0.0030;0.0071 0.5113 -0.0284 -
0.0231 -0.0008 0.0488 -0.0108 0.0070;-0.0487 -0.0284 0.5957 0.0872 -0.0642 -0.1009 -0.0073 -
0.0119;-0.0517 -0.0231 0.0872 0.5822 -0.0783 -0.0732 -0.0196 -0.0073;0.0842 -0.0008 -0.0642
-0.0783 0.6814 -0.0631 0.0951 -0.0164;0.0026 0.0488 -0.1009 -0.0732 -0.0631 0.7301 -0.0775
0.0356;0.0373 -0.0108 -0.0073 -0.0196 0.0951 -0.0775 0.5593 -0.0150;-0.0030 0.0070 -0.0119 -
0.0073 -0.0164 0.0356 -0.0150 0.5058]

Y=[-0.2770 -0.0059 0.1062 0.0817 -0.1806 -0.0112 -0.0740 0.0092;-0.0059 -0.3146 -0.0199
0.1040 -0.0215 -0.1045 0.0802 0.1598;0.1062 -0.0199 -0.4553 -0.1476 0.0882 0.1728 0.0650
0.1844;0.0817 0.1040 -0.1476 -0.3480 0.1884 0.1564 0.0232 -0.0346;-0.1806 -0.0215 0.0882
0.1884 -0.5600 0.1209 -0.1732 0.1088;-0.0112 -0.1045 0.1728 0.1564 0.1209 -0.6623 0.1717 -
0.0228;-0.0740 0.0802 0.0650 0.0232 -0.1732 0.1717 -0.3343 -0.0579;0.0092 0.1598 0.1844 -
0.0345 0.1088 -0.0228 -0.0579 -0.4573]

Path Method is applied to the BMI problem

The method lasts 1.3286 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9818 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 6 in this batch has the following matrices (Rs)

R1=[-1.1231 -0.5348 0.0825 -0.2125 0.2453 -0.4638 -0.1776 0.0342;-0.5348 0.3439 -0.2800 -
0.6074 -0.4091 -0.1307 0.1389 -0.2542;0.0825 -0.2800 -0.3832 0.4881 -0.1279 0.3818 -0.3434
0.8436;-0.2125 -0.6074 0.4881 0.1269 0.5708 0.3177 0.3087 -0.0530;0.2453 -0.4091 -0.1279
0.5708 0.3137 0.6571 -0.4581 -0.2829;-0.4638 -0.1307 0.3818 0.3177 0.6571 0.7976 -0.0780
0.2082;-0.1776 0.1389 -0.3434 0.3087 -0.4581 -0.0780 -0.7248 0.2761;0.0342 -0.2542 0.8436 -
0.0530 -0.2829 0.2082 0.2761 0.4037]

Benders Method is applied to the BMI problem

The method lasts 2.3909 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.4404 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9108 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[-0.8018 0.6593 0.1141 -0.1553 -0.3232 0.3289 0.8217 0.6301;0.6593 0.4099 -0.1713 -0.3096 -0.0139 -0.3190 0.0937 -0.5630;0.1141 -0.1713 -0.4307 0.2891 -0.4173 -0.4276 0.1809 -0.0551;-0.1553 -0.3096 0.2891 -0.3933 -0.2131 0.2965 -0.1579 -0.5763;-0.3232 -0.0139 -0.4173 -0.2131 0.6575 0.7876 0.4704 -0.3207;0.3289 -0.3190 -0.4276 0.2965 0.7876 0.3831 0.1085 -0.0909;0.8217 0.0937 0.1809 -0.1579 0.4704 0.1085 0.7016 0.4615;0.6301 -0.5630 -0.0551 -0.5763 -0.3207 -0.0909 0.4615 0.3594]

Benders Method is applied to the BMI problem

The method lasts 3.6433 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.2237 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9082 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 8 in this batch has the following matrices (Rs)

R1=[0.3021 0.1697 -0.3554 -0.0999 -0.4203 0.0964 -0.4651 -0.3251;0.1697 -0.0601 -0.1452 -
0.2224 -0.0031 -0.7454 -0.2492 -0.0683;-0.3554 -0.1452 -0.8994 0.6335 -0.0680 0.2526 -0.3654
0.0265;-0.0999 -0.2224 0.6335 -1.0093 -0.7284 0.3241 -0.4137 0.6528;-0.4203 -0.0031 -0.0680
-0.7284 0.4076 -0.0061 -0.4685 0.2668;0.0964 -0.7454 0.2526 0.3241 -0.0061 0.0491 -0.5332 -
0.9645;-0.4651 -0.2492 -0.3654 -0.4137 -0.4685 -0.5332 -1.0672 -0.1227;-0.3251 -0.0683
0.0265 0.6528 0.2668 -0.9645 -0.1227 -0.5177]

Benders Method is applied to the BMI problem

The method lasts 2.4255 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.1645 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9713 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 9 in this batch has the following matrices (Rs)

R1=[-0.5011 -0.4866 0.4064 -0.6165 0.2466 0.3364 0.0060 -0.0562;-0.4866 0.5523 -0.2211
0.0756 -0.0886 -0.5924 0.2446 0.1701;0.4064 -0.2211 -0.9968 0.0215 0.0915 -0.8591 0.6334
0.1717;-0.6165 0.0756 0.0215 -1.0553 0.2806 0.2024 0.1111 0.4902;0.2466 -0.0886 0.0915
0.2806 -0.7919 0.4890 0.0027 0.7820;0.3364 -0.5924 -0.8591 0.2024 0.4890 -0.5050 -0.3381 -
0.1037;0.0060 0.2446 0.6334 0.1111 0.0027 -0.3381 0.1770 0.0234;-0.0562 0.1701 0.1717
0.4902 0.7820 -0.1037 0.0234 0.4896]

Benders Method is applied to the BMI problem

The method lasts 3.3792 seconds

The method found a feasible solution given in the following

X=[0.5344 -0.0838 -0.0218 -0.0127 0.0097 0.0563 -0.0488 -0.0253;-0.0838 0.7054 0.0530
0.0266 -0.0313 -0.1399 0.1196 0.0477;-0.0218 0.0530 0.5140 0.0097 -0.0036 -0.0348 0.0308
0.0210;-0.0127 0.0266 0.0097 0.5288 0.0370 -0.0067 0.0152 0.0849;0.0097 -0.0313 -0.0036
0.0370 0.5712 0.0399 -0.0188 0.1201;0.0563 -0.1399 -0.0348 -0.0067 0.0399 0.6005 -0.0817
0.0030;-0.0488 0.1196 0.0308 0.0152 -0.0188 -0.0817 0.5697 0.0267;-0.0253 0.0477 0.0210
0.0849 0.1201 0.0030 0.0267 0.7555]

Y=[-0.3705 0.1753 -0.0775 0.1063 -0.0523 -0.0568 -0.0174 0.0220;0.1753 -0.6535 0.0424 -
0.0370 0.0475 0.1650 -0.0597 -0.0531;-0.0775 0.0424 -0.3191 0.0239 -0.0026 0.1543 -0.1835 -
0.0536;0.1063 -0.0370 0.0239 -0.2490 -0.0670 -0.0261 -0.0180 -0.1421;-0.0523 0.0475 -0.0026
-0.0670 -0.3071 -0.0997 0.0018 -0.2231;-0.0568 0.1650 0.1543 -0.0261 -0.0997 -0.4058 0.1408
0.0084;-0.0174 -0.0597 -0.1835 -0.0180 0.0018 0.1408 -0.5370 -0.0192;0.0220 -0.0531 -0.0536
-0.1421 -0.2231 0.0084 -0.0192 -0.6488]

Path Method is applied to the BMI problem

The method lasts 1.8978 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9026 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[-0.9928 -0.0706 0.9503 0.0246 0.5271 0.4227 0.2254 0.1365;-0.0706 -0.0669 -0.1304 -
0.0224 0.3394 -0.1547 -0.2412 0.0180;0.9503 -0.1304 0.3061 0.4059 -0.6723 -0.0837 -0.5333
0.4578;0.0246 -0.0224 0.4059 -0.5354 0.2676 0.2452 0.3706 -0.5679;0.5271 0.3394 -0.6723
0.2676 -1.1442 0.1621 -0.8083 0.0659;0.4227 -0.1547 -0.0837 0.2452 0.1621 -0.4028 -0.5381 -
0.6588;0.2254 -0.2412 -0.5333 0.3706 -0.8083 -0.5381 -0.3357 0.6734;0.1365 0.0180 0.4578 -
0.5679 0.0659 -0.6588 0.6734 -0.9983]

Benders Method is applied to the BMI problem

The method lasts 3.4888 seconds

The method found a feasible solution given in the following

X=[0.5589 -0.0180 0.1247 0.0268 -0.0095 0.0260 -0.0317 0.0046;-0.0180 0.5190 -0.0531 -
0.0008 0.0277 0.0260 -0.0300 -0.0312;0.1247 -0.0531 0.7803 0.0484 -0.0474 0.0175 -0.0232
0.0427;0.0268 -0.0008 0.0484 0.5162 0.0093 0.0305 -0.0362 -0.0143;-0.0095 0.0277 -0.0474
0.0093 0.5471 0.0583 -0.0678 -0.0555;0.0260 0.0260 0.0175 0.0305 0.0583 0.5971 -0.1138 -

0.0730;-0.0317 -0.0300 -0.0232 -0.0362 -0.0678 -0.1138 0.6336 0.0850;0.0046 -0.0312 0.0427 -
0.0143 -0.0555 -0.0730 0.0850 0.5661]

Y=[-0.3686 0.0155 -0.2291 -0.0503 -0.0532 -0.0869 0.0096 -0.0508;0.0155 -0.5993 0.0378
0.0139 -0.1178 0.0687 0.0917 -0.0193;-0.2291 0.0378 -0.7580 -0.0744 0.1098 0.0100 0.0923 -
0.1009;-0.0503 0.0139 -0.0744 -0.4733 -0.0142 -0.0921 -0.0716 0.1268;-0.0532 -0.1178 0.1098
-0.0142 -0.3530 -0.0792 0.1547 0.0491;-0.0869 0.0687 0.0100 -0.0921 -0.0792 -0.4878 0.1588
0.1959;0.0096 0.0917 0.0923 -0.0716 0.1547 0.1588 -0.5780 -0.1407;-0.0508 -0.0193 -0.1009
0.1268 0.0491 0.1959 -0.1407 -0.3764]

Path Method is applied to the BMI problem

The method lasts 1.1627 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9356 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

From here, 10 BMIs in the batch related to $n=8$ and $r=2$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

R1=[-0.6874 -0.2071 0.0369 0.1604 -0.3716 -0.5019 0.7684 0.7214;-0.2071 -0.9527 -0.0700 -
0.2383 0.4496 -0.0744 -0.6809 0.4880;0.0369 -0.0700 -1.1751 -0.8454 -0.5569 -0.2605 0.0536 -

0.1389;0.1604 -0.2383 -0.8454 -0.2930 0.0703 -0.0084 0.4714 -0.4393;-0.3716 0.4496 -0.5569
0.0703 -0.0521 0.2348 0.4005 0.0074;-0.5019 -0.0744 -0.2605 -0.0084 0.2348 0.3734 -0.2177
0.1904;0.7684 -0.6809 0.0536 0.4714 0.4005 -0.2177 -0.3106 0.8545;0.7214 0.4880 -0.1389 -
0.4393 0.0074 0.1904 0.8545 0.5606]

R2=[-1.1043 -0.6048 0.3977 0.2558 -0.2131 -0.1745 -0.7451 -0.4776;-0.6048 0.7955 -0.3615 -
0.7158 -0.1588 -0.1619 -0.5172 0.3675;0.3977 -0.3615 -0.8994 0.6321 -0.2699 -0.0438 -0.7815
0.1760;0.2558 -0.7158 0.6321 -0.2625 0.0536 -0.2050 -0.0675 -0.2555;-0.2131 -0.1588 -0.2699
0.0536 -1.0107 0.0995 0.6582 -0.1663;-0.1745 -0.1619 -0.0438 -0.2050 0.0995 -0.3385 0.2337
0.5957;-0.7451 -0.5172 -0.7815 -0.0675 0.6582 0.2337 -0.4540 -0.8355;-0.4776 0.3675 0.1760 -
0.2555 -0.1663 0.5957 -0.8355 0.6928]

Benders Method is applied to the BMI problem

The method lasts 3.9094 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.4420 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9582 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[-0.2329 0.4322 -0.3976 -0.1328 -0.3745 0.7428 -0.2255 -0.2265;0.4322 -0.4255 -0.2937 -
0.0453 -0.1276 -0.6317 -0.0739 0.0598;-0.3976 -0.2937 0.4750 0.8322 -0.0868 0.1805 -0.5199 -
0.0238;-0.1328 -0.0453 0.8322 -0.4179 -0.4029 0.2137 0.7934 -0.0250;-0.3745 -0.1276 -0.0868
-0.4029 -0.3503 0.2430 0.2960 0.1921;0.7428 -0.6317 0.1805 0.2137 0.2430 -0.8038 -0.4573
0.4484;-0.2255 -0.0739 -0.5199 0.7934 0.2960 -0.4573 -0.3920 -0.2823;-0.2265 0.0598 -0.0238
-0.0250 0.1921 0.4484 -0.2823 -1.1024]

R2=[0.3021 -0.1273 -0.1698 -0.1608 -0.1713 0.2487 0.6047 -0.7396;-0.1273 -0.6753 -0.9234
0.1478 -0.1265 0.0513 -0.5520 0.2161;-0.1698 -0.9234 -0.2466 -0.2470 0.2182 -0.2133 0.3824
0.5712;-0.1608 0.1478 -0.2470 -0.2634 -0.3851 -0.2757 0.4985 -0.0005;-0.1713 -0.1265 0.2182
-0.3851 0.4029 0.0506 0.0332 0.0258;0.2487 0.0513 -0.2133 -0.2757 0.0506 -0.2679 0.0672
0.4219;0.6047 -0.5520 0.3824 0.4985 0.0332 0.0672 0.3315 -0.1157;-0.7396 0.2161 0.5712 -
0.0005 0.0258 0.4219 -0.1157 0.1616]

Benders Method is applied to the BMI problem

The method lasts 3.9205 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.4004 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.0128 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 3 in this batch has the following matrices (Rs)

R1=[-1.0785 0.3220 -0.1235 0.5652 0.3811 -0.0150 -0.6673 -0.2514;0.3220 -0.9902 0.2324 -0.3025 -0.4036 0.0467 -0.0070 0.2416;-0.1235 0.2324 -0.5203 0.5671 0.2254 -0.0968 -0.0741 0.1243;0.5652 -0.3025 0.5671 0.5926 -0.2361 0.5745 -0.1671 -0.1039;0.3811 -0.4036 0.2254 -0.2361 -0.9220 -0.0807 -0.1905 -0.0068;-0.0150 0.0467 -0.0968 0.5745 -0.0807 0.5724 0.8312 0.5956;-0.6673 -0.0070 -0.0741 -0.1671 -0.1905 0.8312 -0.8188 0.2219;-0.2514 0.2416 0.1243 -0.1039 -0.0068 0.5956 0.2219 0.2831]

R2=[0.4042 0.1905 -0.3305 -0.7311 -0.1856 -0.6673 -0.8360 -0.0803;0.1905 -1.1867 -0.0444 -0.4015 0.0561 0.0059 0.1675 0.2710;-0.3305 -0.0444 0.0108 0.1299 -0.4938 -0.6956 0.1976 0.1398;-0.7311 -0.4015 0.1299 -0.7936 0.8014 0.2619 -0.6057 -0.5876;-0.1856 0.0561 -0.4938 0.8014 0.5236 0.0407 0.3173 0.1843;-0.6673 0.0059 -0.6956 0.2619 0.0407 0.0308 -0.1656 0.1285;-0.8360 0.1675 0.1976 -0.6057 0.3173 -0.1656 -1.1285 -0.6217;-0.0803 0.2710 0.1398 -0.5876 0.1843 0.1285 -0.6217 -0.1213]

Benders Method is applied to the BMI problem

The method lasts 3.9191 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.1861 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9756 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 4 in this batch has the following matrices (Rs)

R1=[-0.5789 0.8293 -0.1578 0.1610 -0.2267 -0.4296 0.7328 -0.2522;0.8293 -0.3442 -0.5721
0.3706 -0.5385 0.4630 0.7632 -0.3311;-0.1578 -0.5721 0.6729 -0.2056 0.3732 0.1574 0.1911 -
0.8619;0.1610 0.3706 -0.2056 -0.7077 -0.2673 0.5540 -0.1554 -0.0320;-0.2267 -0.5385 0.3732 -
0.2673 -0.2270 -0.3902 0.6093 0.4236;-0.4296 0.4630 0.1574 0.5540 -0.3902 -0.8847 0.3851 -
0.0873;0.7328 0.7632 0.1911 -0.1554 0.6093 0.3851 0.0498 -0.3097;-0.2522 -0.3311 -0.8619 -
0.0320 0.4236 -0.0873 -0.3097 0.6670]

R2=[-0.9955 0.1178 -0.2138 0.5968 0.2442 0.2236 0.6638 -0.2398;0.1178 -0.7314 -0.1071 -
0.0003 -0.0018 0.2954 -0.7874 0.2225;-0.2138 -0.1071 -1.0906 0.3279 -0.7702 0.3039 -0.0929 -
0.0503;0.5968 -0.0003 0.3279 0.7797 0.3459 0.0227 -0.0688 0.2220;0.2442 -0.0018 -0.7702
0.3459 0.6033 -0.5132 0.2357 -0.8917;0.2236 0.2954 0.3039 0.0227 -0.5132 0.2160 0.7171 -
0.5978;0.6638 -0.7874 -0.0929 -0.0688 0.2357 0.7171 0.2523 -0.3777;-0.2398 0.2225 -0.0503
0.2220 -0.8917 -0.5978 -0.3777 -0.4552]

Benders Method is applied to the BMI problem

The method lasts 5.2897 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.6466 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9864 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 5 in this batch has the following matrices (Rs)

R1=[-0.5570 0.7751 0.6199 0.4977 0.2300 -0.4299 -0.7373 -0.2241;0.7751 -0.0609 0.2935
0.1925 0.3897 -0.5783 -0.4027 -0.0615;0.6199 0.2935 -0.9734 -0.1431 -0.0896 -0.2013 -0.7113
0.3182;0.4977 0.1925 -0.1431 -0.4057 -0.0893 -0.5881 -0.1186 -0.1011;0.2300 0.3897 -0.0896 -
0.0893 0.4662 0.4044 -0.1829 -0.1460;-0.4299 -0.5783 -0.2013 -0.5881 0.4044 -0.0114 0.2987
0.2720;-0.7373 -0.4027 -0.7113 -0.1186 -0.1829 0.2987 -0.9937 -0.1127;-0.2241 -0.0615 0.3182
-0.1011 -0.1460 0.2720 -0.1127 -1.0737]

R2=[0.2758 0.1838 0.2344 0.4182 0.1208 0.1602 0.5484 0.1714;0.1838 -0.5215 -0.0457 -0.0784
0.7188 -0.3234 -0.1821 0.4341;0.2344 -0.0457 -1.0427 -0.1111 -0.1363 -0.4728 0.0736 -
0.0543;0.4182 -0.0784 -0.1111 -0.5092 -0.4950 -0.0820 -0.2300 0.8583;0.1208 0.7188 -0.1363 -
0.4950 0.1673 -0.6141 0.2014 -0.3644;0.1602 -0.3234 -0.4728 -0.0820 -0.6141 -0.9565 -0.6366
0.8231;0.5484 -0.1821 0.0736 -0.2300 0.2014 -0.6366 0.5916 0.1454;0.1714 0.4341 -0.0543
0.8583 -0.3644 0.8231 0.1454 0.5408]

Benders Method is applied to the BMI problem

The method lasts 3.8760 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.1981 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9408 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 6 in this batch has the following matrices (Rs)

R1=[0.6838 -0.2381 -0.2933 -0.1361 -0.6985 0.2185 0.5256 -0.0476;-0.2381 -0.9014 -0.2517
0.1493 -0.1194 -0.1326 -0.1871 -0.8543;-0.2933 -0.2517 -0.1812 -0.1521 -0.0415 0.1363 0.0311
-0.1031;-0.1361 0.1493 -0.1521 -0.7961 0.6093 -0.6431 -0.4473 -0.2345;-0.6985 -0.1194 -
0.0415 0.6093 -0.5280 0.3335 -0.6376 0.0945;0.2185 -0.1326 0.1363 -0.6431 0.3335 0.6973 -
0.4212 0.8803;0.5256 -0.1871 0.0311 -0.4473 -0.6376 -0.4212 -0.2037 0.6487;-0.0476 -0.8543 -
0.1031 -0.2345 0.0945 0.8803 0.6487 0.4351]

R2=[0.7366 -0.0298 0.6336 -0.1024 -0.3474 0.0887 -0.2794 -0.0695;-0.0298 0.1613 0.1314 -
0.2907 0.4392 -0.0611 0.2413 -0.4755;0.6336 0.1314 0.6526 -0.1921 0.0233 -0.6679 0.1732 -
0.1908;-0.1024 -0.2907 -0.1921 -1.0875 0.3334 -0.7373 0.2118 0.6466;-0.3474 0.4392 0.0233

0.3334 -0.5684 -0.0806 -0.2180 -0.0167;0.0887 -0.0611 -0.6679 -0.7373 -0.0806 -0.4124 -
0.1802 0.1320;-0.2794 0.2413 0.1732 0.2118 -0.2180 -0.1802 -0.5224 -0.1766;-0.0695 -0.4755 -
0.1908 0.6466 -0.0167 0.1320 -0.1766 0.2949]

Benders Method is applied to the BMI problem

The method lasts 2.5479 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.1658 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.0332 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[-0.2832 -0.0159 0.2696 0.5439 0.2632 -0.6387 0.1804 0.2234;-0.0159 0.4400 -0.2257 -
0.1214 -0.3911 0.1194 -0.1236 -0.2301;0.2696 -0.2257 -0.6423 0.6480 0.3739 -0.2343 -0.3447 -
0.5715;0.5439 -0.1214 0.6480 -0.7991 0.0166 -0.3598 0.0102 -0.1170;0.2632 -0.3911 0.3739

0.0166 -1.0872 -0.3867 -0.2023 -0.5009;-0.6387 0.1194 -0.2343 -0.3598 -0.3867 -0.5573 0.4101
-0.8070;0.1804 -0.1236 -0.3447 0.0102 -0.2023 0.4101 -0.1065 0.4573;0.2234 -0.2301 -0.5715 -
0.1170 -0.5009 -0.8070 0.4573 -0.1170]

R2=[-0.8122 0.1457 0.0085 0.8362 0.6700 0.6019 0.4693 0.3151;0.1457 -0.1447 0.0219 0.0911
-0.1787 0.4051 0.7132 0.2953;0.0085 0.0219 -0.7513 0.2578 -0.1928 0.2538 -0.3144 -
0.6232;0.8362 0.0911 0.2578 0.7421 0.0001 0.2788 0.4553 -0.0304;0.6700 -0.1787 -0.1928
0.0001 0.0659 -0.1988 0.2956 -0.2128;0.6019 0.4051 0.2538 0.2788 -0.1988 -0.8997 0.1059
0.0696;0.4693 0.7132 -0.3144 0.4553 0.2956 0.1059 0.5012 -0.0332;0.3151 0.2953 -0.6232 -
0.0304 -0.2128 0.0696 -0.0332 0.4963]

Benders Method is applied to the BMI problem

The method lasts 2.5106 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.4251 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9459 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 8 in this batch has the following matrices (Rs)

R1=[0.7971 0.1419 0.4311 -0.0892 -0.4966 -0.7642 -0.0315 -0.1593;0.1419 -0.7018 0.7652
0.3950 -0.1977 0.4663 -0.9161 -0.0890;0.4311 0.7652 -0.3344 -0.0795 0.4859 -0.7516 -0.0771
0.1892;-0.0892 0.3950 -0.0795 -0.5185 0.2797 -0.9821 -0.2723 0.0021;-0.4966 -0.1977 0.4859
0.2797 -0.4041 -0.0566 0.0235 0.3281;-0.7642 0.4663 -0.7516 -0.9821 -0.0566 -0.6208 0.2953
0.5105;-0.0315 -0.9161 -0.0771 -0.2723 0.0235 0.2953 -0.3659 0.1416;-0.1593 -0.0890 0.1892
0.0021 0.3281 0.5105 0.1416 0.3305]

R2=[0.1082 -0.6924 -0.0921 0.6419 0.4608 -0.2114 0.5432 0.1715;-0.6924 -0.7645 0.3357 -
0.1582 0.3818 -0.2198 0.3072 -0.1994;-0.0921 0.3357 0.0412 -0.0166 0.3736 0.7385 -0.0727
0.1362;0.6419 -0.1582 -0.0166 -0.2895 -0.1667 -0.0398 0.2881 -0.0150;0.4608 0.3818 0.3736 -
0.1667 0.7316 -0.0942 0.1662 -0.5127;-0.2114 -0.2198 0.7385 -0.0398 -0.0942 0.0008 -0.3175
0.3546;0.5432 0.3072 -0.0727 0.2881 0.1662 -0.3175 -1.0887 0.3920;0.1715 -0.1994 0.1362 -
0.0150 -0.5127 0.3546 0.3920 -0.0541]

Benders Method is applied to the BMI problem

The method lasts 2.5226 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.1380 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9850 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 9 in this batch has the following matrices (Rs)

R1=[0.5958 0.4540 0.1961 -0.6160 -0.1197 0.0849 0.0195 0.0657;0.4540 -0.7102 0.6408 -
0.4215 -0.2035 0.5042 0.4087 -0.1116;0.1961 0.6408 0.6414 -0.5625 0.0782 -0.2660 -0.0564 -
0.2771;-0.6160 -0.4215 -0.5625 -0.6783 -0.0267 -0.1821 0.1435 -0.1612;-0.1197 -0.2035 0.0782
-0.0267 -0.3456 -0.0833 0.7916 -0.1571;0.0849 0.5042 -0.2660 -0.1821 -0.0833 -0.2988 -0.2422
0.1931;0.0195 0.4087 -0.0564 0.1435 0.7916 -0.2422 0.3397 0.2424;0.0657 -0.1116 -0.2771 -
0.1612 -0.1571 0.1931 0.2424 -1.0526]

R2=[-0.1909 -0.5716 0.9772 -0.5767 -0.0623 0.0563 0.3525 0.1532;-0.5716 0.1725 0.0407 -
0.2178 0.3218 0.5510 -0.2840 0.6176;0.9772 0.0407 -0.0880 -0.2283 -0.2835 -0.2503 0.0993 -
0.2960;-0.5767 -0.2178 -0.2283 -1.0098 -0.0429 -0.5938 -0.4361 0.0050;-0.0623 0.3218 -0.2835
-0.0429 0.1801 0.6402 -0.0531 0.8652;0.0563 0.5510 -0.2503 -0.5938 0.6402 -0.6191 -0.2603 -
0.6481;0.3525 -0.2840 0.0993 -0.4361 -0.0531 -0.2603 -0.4623 -0.1918;0.1532 0.6176 -0.2960
0.0050 0.8652 -0.6481 -0.1918 -0.8350]

Benders Method is applied to the BMI problem

The method lasts 3.8745 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.2340 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9548 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[0.0549 -0.0136 -0.4429 0.0175 -0.2260 -0.7590 0.1191 0.4781;-0.0136 -0.6332 -0.3998 -
0.1033 0.0126 -0.0533 0.9037 -0.2325;-0.4429 -0.3998 0.3460 -0.4207 -0.0906 0.0650 0.1236 -
0.6860;0.0175 -0.1033 -0.4207 -0.7823 0.5193 0.0414 -0.1714 0.2151;-0.2260 0.0126 -0.0906
0.5193 -1.0927 -0.2153 -0.6732 0.0438;-0.7590 -0.0533 0.0650 0.0414 -0.2153 -0.4671 -0.1453
0.7605;0.1191 0.9037 0.1236 -0.1714 -0.6732 -0.1453 -0.4469 -0.6455;0.4781 -0.2325 -0.6860
0.2151 0.0438 0.7605 -0.6455 -1.0288]

R2=[0.4747 -0.3334 0.6220 0.1584 -0.1946 -0.2187 -0.1640 0.5437;-0.3334 -0.1421 -0.8638
0.5214 0.0338 0.3131 -0.4388 -0.2575;0.6220 -0.8638 -0.7010 -0.1722 -0.4608 0.2892 -0.0906 -
0.3326;0.1584 0.5214 -0.1722 -0.6523 0.0984 0.1582 0.5098 -0.1218;-0.1946 0.0338 -0.4608
0.0984 0.2525 -0.0095 0.2955 -0.2586;-0.2187 0.3131 0.2892 0.1582 -0.0095 0.0164 0.5949
0.1746;-0.1640 -0.4388 -0.0906 0.5098 0.2955 0.5949 -0.0208 -0.2655;0.5437 -0.2575 -0.3326 -
0.1218 -0.2586 0.1746 -0.2655 -1.0494]

Benders Method is applied to the BMI problem

The method lasts 3.8909 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.4701 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9619 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

From here, 10 BMIs in the batch related to $n=8$ and $r=3$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.1394 & 0.6071 & 0.5524 & 0.1598 & 0.4893 & 0.5289 & 0.1162 & -0.4256 & 0.6071 & -1.0537 & 0.4787 & 0.3129 \\ 0.0101 & -0.6632 & 0.4568 & 0.3454 & 0.5524 & 0.4787 & -0.7766 & -0.0770 & 0.8917 & -0.2795 & -0.4932 \\ 0.1488 & 0.1598 & 0.3129 & -0.0770 & -0.4931 & -0.1201 & -0.5486 & 0.6338 & 0.1471 & 0.4893 & 0.0101 & 0.8917 \\ -0.1201 & -0.2404 & -0.1341 & -0.4768 & -0.0385 & 0.5289 & -0.6632 & -0.2795 & -0.5486 & -0.1341 & -0.7912 & 0.0049 \\ 0.4560 & 0.1162 & 0.4568 & -0.4932 & 0.6338 & -0.4768 & 0.0049 & 0.5315 & 0.1184 & -0.4256 & 0.3454 & 0.1488 \\ 0.1471 & -0.0385 & 0.4560 & 0.1184 & -1.0959 & & & & & & & \end{bmatrix}$

$R2 = \begin{bmatrix} -1.1923 & -0.6535 & -0.8550 & -0.0037 & 0.1708 & 0.4974 & -0.7258 & 0.1077 & -0.6535 & -0.7165 & -0.0525 \\ 0.4251 & -0.1410 & -0.0309 & 0.0037 & 0.6075 & -0.8550 & -0.0525 & 0.4558 & 0.5174 & -0.5045 & 0.2996 & 0.3759 \\ -0.4145 & -0.0037 & 0.4251 & 0.5174 & 0.7875 & 0.7108 & 0.0536 & -0.2624 & 0.1099 & 0.1708 & -0.1410 & -0.5045 \\ 0.7108 & -0.5145 & 0.0296 & -0.4150 & -0.5514 & 0.4974 & -0.0309 & 0.2996 & 0.0536 & 0.0296 & 0.6462 & -0.2405 \\ 0.3827 & -0.7258 & 0.0037 & 0.3759 & -0.2624 & -0.4150 & -0.2405 & 0.5706 & 0.4400 & 0.1077 & 0.6075 & -0.4145 \\ 0.1099 & -0.5514 & 0.3827 & 0.4400 & 0.1799 & & & & & & & \end{bmatrix}$

$R3 = \begin{bmatrix} 0.4896 & -0.4213 & 0.4168 & 0.1274 & 0.1103 & -0.6099 & 0.2410 & -0.6419 & -0.4213 & -1.0407 & 0.4298 \\ 0.0339 & 0.2736 & 0.2565 & -0.4545 & -0.2720 & 0.4168 & 0.4298 & -0.0021 & -0.0374 & -0.5261 & 0.6276 & 0.1840 \\ -0.2832 & 0.1274 & 0.0339 & -0.0374 & 0.7418 & -0.5218 & 0.5862 & -0.0956 & -0.2778 & 0.1103 & 0.2736 & -0.5261 \end{bmatrix}$

0.5218 -0.6039 0.3067 0.2193 -0.0816;-0.6099 0.2565 0.6276 0.5862 0.3067 0.7536 -0.1403 -
0.2554;0.2410 -0.4545 0.1840 -0.0956 0.2193 -0.1403 -0.0287 0.6738;-0.6419 -0.2720 -0.2832 -
0.2778 -0.0816 -0.2554 0.6738 0.2692]

Benders Method is applied to the BMI problem

The method lasts 4.0828 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.5143 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.0154 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[0.3310 -0.0319 -0.4991 0.0606 0.4084 0.2297 0.6389 -0.0968;-0.0319 -0.2436 -0.4547 -
0.2570 -0.2652 -0.0034 -0.4978 0.3404;-0.4991 -0.4547 -0.0681 -0.2427 0.3101 0.2345 0.2640 -
0.3829;0.0606 -0.2570 -0.2427 -0.1452 0.6407 -0.1257 -0.3520 -0.1380;0.4084 -0.2652 0.3101

0.6407 -0.1079 -0.1583 0.7500 0.2471;0.2297 -0.0034 0.2345 -0.1257 -0.1583 -0.2122 -0.6133 -
0.6158;0.6389 -0.4978 0.2640 -0.3520 0.7500 -0.6133 0.5720 -0.4769;-0.0968 0.3404 -0.3829 -
0.1380 0.2471 -0.6158 -0.4769 0.7045]

R2=[-0.5967 0.6641 -0.2050 0.3570 0.0356 0.4412 -0.3199 0.1817;0.6641 0.7381 -0.0144 -
0.0888 0.6262 -0.6285 0.3805 0.0252;-0.2050 -0.0144 -1.1572 -0.0248 -0.3794 0.0950 -0.2522 -
0.0554;0.3570 -0.0888 -0.0248 0.7206 -0.4317 -0.2024 -0.6880 -0.9192;0.0356 0.6262 -0.3794 -
0.4317 -0.2176 -0.3725 -0.0975 -0.5449;0.4412 -0.6285 0.0950 -0.2024 -0.3725 0.6995 0.0591 -
0.0982;-0.3199 0.3805 -0.2522 -0.6880 -0.0975 0.0591 -0.6833 0.0225;0.1817 0.0252 -0.0554 -
0.9192 -0.5449 -0.0982 0.0225 0.5446]

R3=[-0.2682 0.7603 0.4874 -0.4511 -0.1941 -0.2579 0.2781 0.0967;0.7603 -1.1224 -0.0358 -
0.6377 -0.4196 0.7878 0.5942 0.5842;0.4874 -0.0358 0.4591 -0.3602 -0.3222 0.0145 0.7659 -
0.4418;-0.4511 -0.6377 -0.3602 -0.0429 -0.3968 -0.1987 -0.4717 -0.0373;-0.1941 -0.4196 -
0.3222 -0.3968 -0.5729 -0.3212 0.1997 0.5563;-0.2579 0.7878 0.0145 -0.1987 -0.3212 -0.0429 -
0.2104 0.0973;0.2781 0.5942 0.7659 -0.4717 0.1997 -0.2104 0.1781 0.4099;0.0967 0.5842 -
0.4418 -0.0373 0.5563 0.0973 0.4099 -0.2436]

Benders Method is applied to the BMI problem

The method lasts 5.4265 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.1495 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9576 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 3 in this batch has the following matrices (Rs)

R1=[-0.2774 0.2028 -0.7703 0.6734 0.0227 -0.2771 -0.3168 -0.2052;0.2028 -0.5524 -0.1421 -0.9555 0.2884 0.3052 -0.4267 0.2390;-0.7703 -0.1421 0.4800 0.2439 0.4317 0.2708 0.1395 -0.6585;0.6734 -0.9555 0.2439 -0.4343 -0.1065 0.3636 0.3524 0.8201;0.0227 0.2884 0.4317 -0.1065 0.4362 -0.4438 0.8692 -0.1476;-0.2771 0.3052 0.2708 0.3636 -0.4438 -0.9488 -0.0975 0.4015;-0.3168 -0.4267 0.1395 0.3524 0.8692 -0.0975 -0.7566 -0.3684;-0.2052 0.2390 -0.6585 0.8201 -0.1476 0.4015 -0.3684 0.6490]

R2=[-1.0677 0.4229 0.0959 -0.5875 -0.6323 0.3615 0.3338 0.4113;0.4229 0.7243 0.0803 -0.2850 -0.8688 -0.3228 0.3521 0.2610;0.0959 0.0803 0.5488 0.3012 -0.5565 -0.3197 0.8005 0.2495;-0.5875 -0.2850 0.3012 -0.1707 -0.3183 -0.9311 -0.1260 -0.0881;-0.6323 -0.8688 -0.5565 -0.3183 -0.5295 0.1602 0.5080 0.1547;0.3615 -0.3228 -0.3197 -0.9311 0.1602 0.6840 0.1782 0.4549;0.3338 0.3521 0.8005 -0.1260 0.5080 0.1782 -0.3516 0.2445;0.4113 0.2610 0.2495 -0.0881 0.1547 0.4549 0.2445 -0.9617]

R3=[0.5204 -0.5287 0.0542 0.1207 -0.1018 -0.7333 -0.0901 -0.3310;-0.5287 -0.1626 0.1652 0.0486 -0.3920 0.0558 -0.1568 0.5479;0.0542 0.1652 0.5445 0.1565 0.4163 0.1981 0.1146 0.6090;0.1207 0.0486 0.1565 -0.9612 0.5898 -0.0747 0.0304 -0.5810;-0.1018 -0.3920 0.4163 0.5898 -0.4590 0.0548 -0.6818 0.2659;-0.7333 0.0558 0.1981 -0.0747 0.0548 -0.0585 0.5256 0.2355;-0.0901 -0.1568 0.1146 0.0304 -0.6818 0.5256 0.3108 -0.3610;-0.3310 0.5479 0.6090 -0.5810 0.2659 0.2355 -0.3610 -0.4100]

Benders Method is applied to the BMI problem

The method lasts 5.5078 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.2472 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9536 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 4 in this batch has the following matrices (Rs)

R1=[0.3719 0.1493 -0.1209 0.4491 0.1859 -0.0453 0.4918 0.4064;0.1493 -0.2938 -0.0922 -0.0084 -0.8040 -0.3200 0.2134 -0.2712;-0.1209 -0.0922 -0.9676 0.4814 -0.1339 -0.1400 0.1582 -0.3731;0.4491 -0.0084 0.4814 -1.1855 -0.1476 0.5163 -0.5002 -0.3590;0.1859 -0.8040 -0.1339 -0.1476 0.6340 -0.3855 -0.6087 0.2384;-0.0453 -0.3200 -0.1400 0.5163 -0.3855 -0.1041 0.7163 -0.0923;0.4918 0.2134 0.1582 -0.5002 -0.6087 0.7163 -0.6525 -0.6914;0.4064 -0.2712 -0.3731 -0.3590 0.2384 -0.0923 -0.6914 0.5659]

R2=[-0.9386 -0.1947 0.0083 -0.4267 -0.2908 0.0549 -0.1900 0.1730;-0.1947 -1.0382 0.4421 0.1177 -0.5762 0.0710 0.2780 -0.1747;0.0083 0.4421 0.3988 -0.3665 -0.1295 0.1303 -0.3684 0.3442;-0.4267 0.1177 -0.3665 0.6040 -0.6494 0.3557 -0.5091 -0.4304;-0.2908 -0.5762 -0.1295 -0.6494 -0.3789 -0.3332 -0.4016 -0.1463;0.0549 0.0710 0.1303 0.3557 -0.3332 -0.2935 0.0727 -0.3102;-0.1900 0.2780 -0.3684 -0.5091 -0.4016 0.0727 -0.8753 0.0639;0.1730 -0.1747 0.3442 -0.4304 -0.1463 -0.3102 0.0639 -0.2135]

R3=[-0.0501 0.6023 -0.3263 -0.5904 -0.3817 -0.2750 0.0857 0.5403;0.6023 0.0092 0.5210 0.6491 -0.1970 -0.1319 -0.0291 -0.0068;-0.3263 0.5210 -0.6085 -0.3404 0.0120 0.4241 0.3491 0.9464;-0.5904 0.6491 -0.3404 -0.7501 -0.7368 0.0223 -0.2191 0.6918;-0.3817 -0.1970 0.0120 -0.7368 0.3507 -0.5275 0.3148 -0.9085;-0.2750 -0.1319 0.4241 0.0223 -0.5275 -0.7504 -0.4922 -

0.2041;0.0857 -0.0291 0.3491 -0.2191 0.3148 -0.4922 0.4514 0.1302;0.5403 -0.0068 0.9464
0.6918 -0.9085 -0.2041 0.1302 -0.5404]

Benders Method is applied to the BMI problem

The method lasts 4.0886 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.2166 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.4372 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 5 in this batch has the following matrices (Rs)

R1=[-0.7111 -0.0937 0.1799 0.3277 0.3667 -0.3356 -0.7174 -0.2297;-0.0937 -0.5861 -0.3039 -
0.2840 0.0289 0.1546 -0.4415 0.1476;0.1799 -0.3039 -1.0940 -0.3076 -0.0024 0.1472 -0.0401 -
0.5273;0.3277 -0.2840 -0.3076 -0.6501 -0.5380 -0.7518 0.3691 -0.3072;0.3667 0.0289 -0.0024 -
0.5380 0.4499 -0.6430 -0.2876 -0.2465;-0.3356 0.1546 0.1472 -0.7518 -0.6430 -0.4195 -0.3922

-0.2308;-0.7174 -0.4415 -0.0401 0.3691 -0.2876 -0.3922 -0.6542 -0.0979;-0.2297 0.1476 -
0.5273 -0.3072 -0.2465 -0.2308 -0.0979 -0.0358]

R2=[0.0619 0.8659 0.2145 -0.6895 -0.2986 0.1759 0.0946 -0.3939;0.8659 -0.5531 -0.7005 -
0.1847 -0.0289 0.1227 -0.5964 0.0276;0.2145 -0.7005 -1.1766 0.0297 -0.2446 0.4561 -0.1739 -
0.4586;-0.6895 -0.1847 0.0297 -1.0153 0.1566 0.0685 0.1415 -0.0592;-0.2986 -0.0289 -0.2446
0.1566 -0.6551 0.0667 -0.5844 0.4616;0.1759 0.1227 0.4561 0.0685 0.0667 -0.7845 -0.0493 -
0.5476;0.0946 -0.5964 -0.1739 0.1415 -0.5844 -0.0493 -0.9436 -0.0071;-0.3939 0.0276 -0.4586
-0.0592 0.4616 -0.5476 -0.0071 0.1124]

R3=[0.2719 -0.2390 0.3080 0.4836 0.1410 -0.2042 0.4292 -0.0876;-0.2390 0.5616 0.8167
0.4531 0.0867 -0.3486 -0.1595 0.7820;0.3080 0.8167 -0.5131 0.0119 0.0496 0.4704 0.0758
0.0946;0.4836 0.4531 0.0119 -0.4027 0.2004 -0.4922 -0.4627 -0.0280;0.1410 0.0867 0.0496
0.2004 -0.9365 -0.4931 0.2458 0.4227;-0.2042 -0.3486 0.4704 -0.4922 -0.4931 0.3153 0.1433 -
0.6023;0.4292 -0.1595 0.0758 -0.4627 0.2458 0.1433 -0.4866 -0.5750;-0.0876 0.7820 0.0946 -
0.0280 0.4227 -0.6023 -0.5750 -0.3102]

Benders Method is applied to the BMI problem

The method lasts 2.6616 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.2159 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.1264 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 6 in this batch has the following matrices (Rs)

R1=[-0.8309 0.4528 -0.4221 0.0119 0.1252 0.8001 0.0871 0.8289;0.4528 -0.0983 0.1955 -0.3392 -0.3135 -0.3408 0.3246 -0.0612;-0.4221 0.1955 -1.0988 -0.3012 -0.0231 0.0080 0.4270 0.8858;0.0119 -0.3392 -0.3012 0.2322 -0.0961 -0.1509 -0.3007 0.2084;0.1252 -0.3135 -0.0231 -0.0961 -0.3145 0.6577 -0.3159 -0.6299;0.8001 -0.3408 0.0080 -0.1509 0.6577 -1.1332 0.1370 0.2177;0.0871 0.3246 0.4270 -0.3007 -0.3159 0.1370 -0.6634 0.0185;0.8289 -0.0612 0.8858 0.2084 -0.6299 0.2177 0.0185 0.7849]

R2=[-1.1779 0.5013 -0.2840 -0.0881 0.0166 -0.0404 -0.7429 0.1391;0.5013 0.0832 -0.2600 -0.1980 -0.5442 -0.1220 0.5040 0.8371;-0.2840 -0.2600 -0.8335 -0.5297 -0.2629 -0.7214 0.4956 0.3419;-0.0881 -0.1980 -0.5297 -0.7337 -0.8781 -0.5235 -0.6380 -0.8572;0.0166 -0.5442 -0.2629 -0.8781 -0.1153 -0.1288 -0.8533 -0.3640;-0.0404 -0.1220 -0.7214 -0.5235 -0.1288 0.4585 -0.4402 0.1135;-0.7429 0.5040 0.4956 -0.6380 -0.8533 -0.4402 0.1550 -0.3875;0.1391 0.8371 0.3419 -0.8572 -0.3640 0.1135 -0.3875 -0.7886]

R3=[-0.7516 -0.0790 -0.3001 0.0089 0.3103 -0.8196 -0.4216 -0.4119;-0.0790 -0.6930 0.6841 0.1964 0.3088 -0.3119 -0.7545 0.2109;-0.3001 0.6841 -0.2417 0.1449 -0.5698 -0.1956 0.0330 0.7049;0.0089 0.1964 0.1449 -0.0321 0.1325 -0.7399 -0.1404 -0.0529;0.3103 0.3088 -0.5698 0.1325 0.3784 0.0842 -0.3367 0.1574;-0.8196 -0.3119 -0.1956 -0.7399 0.0842 -0.4553 0.2772 -0.0142;-0.4216 -0.7545 0.0330 -0.1404 -0.3367 0.2772 -0.2397 -0.5410;-0.4119 0.2109 0.7049 -0.0529 0.1574 -0.0142 -0.5410 -1.1161]

Benders Method is applied to the BMI problem

The method lasts 5.4965 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.4966 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9649 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[0.4931 0.4737 0.0598 -0.1966 -0.0637 -0.1299 0.5827 0.2314;0.4737 0.7492 -0.4738 -0.3939 0.0854 -0.3520 0.1101 0.2347;0.0598 -0.4738 0.0669 -0.4048 -0.0189 0.3438 0.4570 0.2188;-0.1966 -0.3939 -0.4048 0.2515 0.5828 0.3138 0.3334 0.1704;-0.0637 0.0854 -0.0189 0.5828 -0.8162 -0.3131 0.2544 -0.5609;-0.1299 -0.3520 0.3438 0.3138 -0.3131 0.6021 0.2797 0.1917;0.5827 0.1101 0.4570 0.3334 0.2544 0.2797 -0.9734 -0.0723;0.2314 0.2347 0.2188 0.1704 -0.5609 0.1917 -0.0723 -1.1323]

R2=[-0.1688 0.1096 0.3193 0.6229 -0.8004 0.1918 0.6282 0.2971;0.1096 0.7108 -0.5274 0.2668 0.6975 -0.0635 0.0155 -0.3830;0.3193 -0.5274 0.5758 0.0873 -0.0941 0.7479 0.1268 -0.0045;0.6229 0.2668 0.0873 -0.1999 0.1506 0.5217 -0.3934 0.0867;-0.8004 0.6975 -0.0941 0.1506 0.0573 0.6119 -0.5974 -0.2837;0.1918 -0.0635 0.7479 0.5217 0.6119 -0.6391 -0.0375 0.3671;0.6282 0.0155 0.1268 -0.3934 -0.5974 -0.0375 -0.4591 0.0735;0.2971 -0.3830 -0.0045 0.0867 -0.2837 0.3671 0.0735 -1.1491]

R3=[-0.0403 0.6742 -0.1490 0.0102 -0.5315 -0.3786 0.1253 -0.1086;0.6742 0.5929 0.3855 -0.1313 -0.2588 0.4957 -0.6711 0.4558;-0.1490 0.3855 0.1346 0.7343 -0.6674 0.2937 -0.2232 -0.2477;0.0102 -0.1313 0.7343 0.6741 -0.1189 -0.7458 -0.3531 0.0242;-0.5315 -0.2588 -0.6674 -0.1189 -0.1048 -0.4071 0.3454 0.0127;-0.3786 0.4957 0.2937 -0.7458 -0.4071 -0.6832 -0.4046

0.1319;0.1253 -0.6711 -0.2232 -0.3531 0.3454 -0.4046 0.4334 0.1638;-0.1086 0.4558 -0.2477
0.0242 0.0127 0.1319 0.1638 -0.0725]

Benders Method is applied to the BMI problem

The method lasts 4.0551 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.5026 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9906 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 8 in this batch has the following matrices (Rs)

R1=[0.5357 -0.1567 -0.0725 -0.3667 -0.1377 0.8851 0.1502 -0.7012;-0.1567 -0.2645 -0.5139
0.1357 -0.4629 -0.5145 0.5706 -0.2585;-0.0725 -0.5139 -0.2880 0.3688 0.2722 -0.0725 -0.7979
-0.0528;-0.3667 0.1357 0.3688 -0.5005 0.3166 -0.3879 -0.6007 0.8566;-0.1377 -0.4629 0.2722
0.3166 0.7410 -0.4968 0.3253 -0.2038;0.8851 -0.5145 -0.0725 -0.3879 -0.4968 -1.1721 -0.5558

0.5779;0.1502 0.5706 -0.7979 -0.6007 0.3253 -0.5558 -1.1270 -0.0065;-0.7012 -0.2585 -0.0528
0.8566 -0.2038 0.5779 -0.0065 -0.0395]

R2=[-0.5322 -0.8568 0.6404 0.3291 -0.0673 0.3699 -0.3916 0.3830;-0.8568 -0.2445 -0.7095 -
0.1349 0.1947 0.0095 0.6870 -0.1357;0.6404 -0.7095 -0.8453 -0.0218 0.1250 -0.0510 -0.2859 -
0.0517;0.3291 -0.1349 -0.0218 -0.2319 -0.3501 -0.2110 -0.5215 -0.2583;-0.0673 0.1947 0.1250
-0.3501 0.0390 0.5308 0.6479 0.2054;0.3699 0.0095 -0.0510 -0.2110 0.5308 -1.0500 0.2244 -
0.7492;-0.3916 0.6870 -0.2859 -0.5215 0.6479 0.2244 0.2204 -0.0342;0.3830 -0.1357 -0.0517 -
0.2583 0.2054 -0.7492 -0.0342 0.3759]

R3=[-0.6032 0.0449 0.8526 -0.0726 0.5078 0.0856 0.3375 0.0845;0.0449 -0.3889 -0.1035 -
0.4314 0.7737 -0.0667 0.2056 -0.7169;0.8526 -0.1035 -0.0439 0.8445 -0.3505 -0.2739 -0.3752 -
0.9027;-0.0726 -0.4314 0.8445 0.2245 -0.1077 0.1502 0.3807 -0.4233;0.5078 0.7737 -0.3505 -
0.1077 -0.3033 -0.3148 -0.5880 0.5202;0.0856 -0.0667 -0.2739 0.1502 -0.3148 -0.6988 -0.3815
-0.4985;0.3375 0.2056 -0.3752 0.3807 -0.5880 -0.3815 -1.1240 -0.1405;0.0845 -0.7169 -0.9027
-0.4233 0.5202 -0.4985 -0.1405 0.2026]

Benders Method is applied to the BMI problem

The method lasts 5.4843 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.5463 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9939 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 9 in this batch has the following matrices (Rs)

R1=[0.4353 0.0688 -0.0850 -0.9118 0.2900 -0.6440 -0.0544 -0.2819;0.0688 -0.3823 -0.6428 0.2346 0.3910 -0.0443 -0.2935 0.3795;-0.0850 -0.6428 -0.2286 -0.0327 0.6240 -0.5585 0.1035 0.1557;-0.9118 0.2346 -0.0327 -0.3142 -0.7109 -0.6445 0.4169 -0.0786;0.2900 0.3910 0.6240 -0.7109 -0.3407 -0.2102 -0.3103 -0.0888;-0.6440 -0.0443 -0.5585 -0.6445 -0.2102 -1.1393 -0.5844 -0.2040;-0.0544 -0.2935 0.1035 0.4169 -0.3103 -0.5844 0.1620 -0.4839;-0.2819 0.3795 0.1557 -0.0786 -0.0888 -0.2040 -0.4839 -1.0921]

R2=[-0.4612 0.2428 -0.2750 -0.1556 -0.2255 -0.1193 0.0199 0.9437;0.2428 -0.3002 0.1308 0.4807 0.6277 -0.1147 0.3599 0.1338;-0.2750 0.1308 -1.0544 0.0723 -0.1300 -0.4972 0.2525 0.6670;-0.1556 0.4807 0.0723 -1.0516 0.1040 -0.5206 0.1000 -0.8353;-0.2255 0.6277 -0.1300 0.1040 0.6088 0.1311 0.1390 0.0460;-0.1193 -0.1147 -0.4972 -0.5206 0.1311 -1.0640 0.6807 -0.2632;0.0199 0.3599 0.2525 0.1000 0.1390 0.6807 -0.9430 0.6449;0.9437 0.1338 0.6670 -0.8353 0.0460 -0.2632 0.6449 -0.1510]

R3=[0.7675 -0.0841 -0.5869 0.1787 0.3204 -0.5316 -0.2197 -0.2431;-0.0841 0.3094 -0.3735 -0.1106 -0.8060 -0.0165 -0.3455 0.4501;-0.5869 -0.3735 0.5627 0.1200 0.9837 -0.4601 0.1447 -0.1096;0.1787 -0.1106 0.1200 -0.2712 0.0105 0.0088 -0.4172 0.2904;0.3204 -0.8060 0.9837 0.0105 -0.5868 0.0173 -0.6224 0.8699;-0.5316 -0.0165 -0.4601 0.0088 0.0173 0.1605 0.0281 -0.1314;-0.2197 -0.3455 0.1447 -0.4172 -0.6224 0.0281 -0.8777 -0.2186;-0.2431 0.4501 -0.1096 0.2904 0.8699 -0.1314 -0.2186 0.3473]

Benders Method is applied to the BMI problem

The method lasts 4.1058 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.1444 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9602 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[-0.5920 0.4214 0.0423 0.5197 0.4596 -0.4047 0.1717 -0.0217;0.4214 0.3587 0.6360 -0.2509 0.3380 0.4516 0.6711 0.8117;0.0423 0.6360 -0.4007 -0.0189 0.3124 -0.4160 0.0961 -0.0685;0.5197 -0.2509 -0.0189 -0.2486 0.4245 0.2488 -0.0138 -0.1559;0.4596 0.3380 0.3124 0.4245 -0.7759 0.3095 0.3635 -0.0526;-0.4047 0.4516 -0.4160 0.2488 0.3095 0.1771 -0.6024 -0.2368;0.1717 0.6711 0.0961 -0.0138 0.3635 -0.6024 -0.1635 -0.0275;-0.0217 0.8117 -0.0685 -0.1559 -0.0526 -0.2368 -0.0275 -0.2662]

R2=[0.3874 0.2828 -0.0354 0.2305 -0.0317 -0.9191 -0.0394 -0.0489;0.2828 -0.2883 0.0109 -0.6453 0.0433 0.3182 -0.0233 -0.3835;-0.0354 0.0109 -0.3307 -0.0103 0.4852 -0.0709 0.5475 0.1444;0.2305 -0.6453 -0.0103 0.4058 0.3210 -0.4038 0.1942 0.5186;-0.0317 0.0433 0.4852 0.3210 -0.8568 -0.6471 -0.1381 0.2685;-0.9191 0.3182 -0.0709 -0.4038 -0.6471 0.0348 0.4763 0.3764;-0.0394 -0.0233 0.5475 0.1942 -0.1381 0.4763 0.0313 0.1632;-0.0489 -0.3835 0.1444 0.5186 0.2685 0.3764 0.1632 0.0068]

R3=[-0.7219 0.1370 0.1709 0.2507 0.0834 -0.4706 -0.6240 0.3999;0.1370 -0.8615 0.2053 0.1821 0.3283 -0.2556 0.0130 -0.3660;0.1709 0.2053 -0.2868 -0.0369 -0.5191 -0.2109 0.1103 -0.2396;0.2507 0.1821 -0.0369 -0.5187 -0.1329 -0.4486 0.2403 0.0557;0.0834 0.3283 -0.5191 -0.1329 -0.5164 -0.0988 -0.1357 -0.6678;-0.4706 -0.2556 -0.2109 -0.4486 -0.0988 -0.7046 -

0.1883 -0.2920;-0.6240 0.0130 0.1103 0.2403 -0.1357 -0.1883 0.7515 -0.0065;0.3999 -0.3660 -
0.2396 0.0557 -0.6678 -0.2920 -0.0065 0.1672]

Benders Method is applied to the BMI problem

The method lasts 4.0602 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.2426 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9790 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

From here, 10 BMIs in the batch related to $n=8$ and $r=4$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

R1=[-0.5040 0.7695 -0.2145 -0.4717 0.5287 0.2553 -0.1482 0.1373;0.7695 -0.0240 -0.1498 -
0.0219 0.1757 0.7701 -0.5765 0.0910;-0.2145 -0.1498 -0.1783 0.1298 0.1925 0.1440 -0.0885

0.1517;-0.4717 -0.0219 0.1298 -0.7817 0.0822 0.6103 -0.0365 -0.7052;0.5287 0.1757 0.1925
0.0822 -0.7170 -0.7274 -0.1357 -0.4418;0.2553 0.7701 0.1440 0.6103 -0.7274 -0.4769 0.4409
0.3426;-0.1482 -0.5765 -0.0885 -0.0365 -0.1357 0.4409 0.3596 -0.2829;0.1373 0.0910 0.1517 -
0.7052 -0.4418 0.3426 -0.2829 -0.5483]

R2=[-0.3481 -0.1532 0.6212 0.5070 -0.2563 -0.1448 0.6092 0.2740;-0.1532 -0.0532 -0.3857
0.4395 0.1039 -0.1586 -0.2939 0.3073;0.6212 -0.3857 -0.2144 0.1054 -0.5097 -0.0800 -0.7031
0.6314;0.5070 0.4395 0.1054 0.2989 0.8395 0.0314 0.5096 0.7070;-0.2563 0.1039 -0.5097
0.8395 0.2657 0.1965 0.0502 -0.1797;-0.1448 -0.1586 -0.0800 0.0314 0.1965 0.5354 -0.4021 -
0.1288;0.6092 -0.2939 -0.7031 0.5096 0.0502 -0.4021 -0.4611 0.0210;0.2740 0.3073 0.6314
0.7070 -0.1797 -0.1288 0.0210 -0.2631]

R3=[-0.4881 0.5698 0.6605 0.1969 -0.2901 -0.6252 0.2875 0.0232;0.5698 0.2171 0.1200 -
0.4830 -0.2343 -0.1731 -0.7557 0.0655;0.6605 0.1200 0.7097 -0.5417 0.1111 0.0220 0.4100
0.1689;0.1969 -0.4830 -0.5417 -0.6877 0.5337 0.8166 0.3900 0.4631;-0.2901 -0.2343 0.1111
0.5337 -0.0187 -0.2428 -0.0799 -0.6139;-0.6252 -0.1731 0.0220 0.8166 -0.2428 -0.5744 0.6055
-0.2817;0.2875 -0.7557 0.4100 0.3900 -0.0799 0.6055 0.3248 0.1758;0.0232 0.0655 0.1689
0.4631 -0.6139 -0.2817 0.1758 0.4947]

R4=[0.2884 0.3165 -0.5092 0.2421 0.4609 -0.8717 0.2995 -0.8761;0.3165 -0.7644 0.1910
0.7730 0.0133 -0.5983 -0.3506 0.2483;-0.5092 0.1910 -0.9545 -0.2755 -0.6233 -0.3838 -0.1904
0.0952;0.2421 0.7730 -0.2755 -1.0142 0.4539 -0.6808 0.1370 -0.0720;0.4609 0.0133 -0.6233
0.4539 -0.9723 -0.1640 0.5647 -0.4844;-0.8717 -0.5983 -0.3838 -0.6808 -0.1640 -0.9764 0.0317
-0.0859;0.2995 -0.3506 -0.1904 0.1370 0.5647 0.0317 -1.0156 -0.2263;-0.8761 0.2483 0.0952 -
0.0720 -0.4844 -0.0859 -0.2263 0.5851]

Benders Method is applied to the BMI problem

The method lasts 4.2119 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.5256 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9972 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[-0.9834 0.3386 0.2505 0.8277 0.6553 -0.2980 -0.0651 0.6330;0.3386 0.7169 -0.2229 -0.5609 0.0604 -0.0520 -0.2715 0.1102;0.2505 -0.2229 -1.0005 -0.2488 -0.4989 0.4217 0.1271 0.2272;0.8277 -0.5609 -0.2488 0.0061 0.2279 0.3741 0.4980 -0.3468;0.6553 0.0604 -0.4989 0.2279 -0.4502 -0.5717 -0.7821 -0.3338;-0.2980 -0.0520 0.4217 0.3741 -0.5717 -0.2673 0.6824 -0.4390;-0.0651 -0.2715 0.1271 0.4980 -0.7821 0.6824 -0.1999 0.2355;0.6330 0.1102 0.2272 -0.3468 -0.3338 -0.4390 0.2355 0.5649]

R2=[0.4972 -0.0368 0.6403 -0.3175 -0.2973 -0.8285 0.0741 0.1356;-0.0368 -0.2434 0.0087 -0.2501 0.2148 0.3948 -0.0103 -0.8403;0.6403 0.0087 0.4998 -0.5396 -0.2077 0.1283 0.0033 0.3141;-0.3175 -0.2501 -0.5396 0.5045 0.1550 0.4882 0.7057 0.1725;-0.2973 0.2148 -0.2077 0.1550 0.3594 -0.2162 0.0728 0.3395;-0.8285 0.3948 0.1283 0.4882 -0.2162 -0.8510 0.1867 -0.6140;0.0741 -0.0103 0.0033 0.7057 0.0728 0.1867 -1.1513 0.1854;0.1356 -0.8403 0.3141 0.1725 0.3395 -0.6140 0.1854 -0.7428]

R3=[-0.0303 0.1531 0.0784 -0.3766 -0.6057 0.0060 0.1291 0.5462;0.1531 0.3906 0.0458 0.0239 0.3744 0.1837 0.1619 -0.4715;0.0784 0.0458 -1.1561 -0.1749 -0.4481 -0.2584 0.0944 0.4578;-0.3766 0.0239 -0.1749 -0.8535 0.4174 -0.3008 0.2276 -0.2551;-0.6057 0.3744 -0.4481 0.4174 -0.3761 0.1038 0.0402 -0.4056;0.0060 0.1837 -0.2584 -0.3008 0.1038 0.3615 0.6135 0.5057;0.1291 0.1619 0.0944 0.2276 0.0402 0.6135 -0.8330 0.5325;0.5462 -0.4715 0.4578 -0.2551 -0.4056 0.5057 0.5325 0.6734]

R4=[-0.6324 -0.4632 0.1123 0.1512 -0.1860 0.3308 0.2297 -0.6463;-0.4632 0.2120 0.3448 -0.0348 0.1022 0.1147 0.0643 0.6473;0.1123 0.3448 -0.6572 -0.1951 0.1574 0.2847 -0.5390 0.4435;0.1512 -0.0348 -0.1951 -0.6683 0.0387 -0.1998 -0.7479 0.7029;-0.1860 0.1022 0.1574

0.0387 -0.9759 -0.6151 0.3562 -0.6662;0.3308 0.1147 0.2847 -0.1998 -0.6151 -0.7794 0.3251
0.2290;0.2297 0.0643 -0.5390 -0.7479 0.3562 0.3251 -0.9543 -0.2209;-0.6463 0.6473 0.4435
0.7029 -0.6662 0.2290 -0.2209 0.6522]

Benders Method is applied to the BMI problem

The method lasts 5.7367 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.2154 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.0539 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 3 in this batch has the following matrices (Rs)

R1=[0.4384 0.0023 0.0696 0.5574 0.0629 -0.1502 -0.1999 -0.1454;0.0023 -0.7964 -0.6037
0.5983 0.1346 -0.6151 0.2243 -0.0636;0.0696 -0.6037 0.0698 -0.2723 -0.1868 -0.0072 -0.4676 -
0.1029;0.5574 0.5983 -0.2723 -0.3660 0.7736 0.4340 0.1521 -0.4875;0.0629 0.1346 -0.1868

0.7736 -0.0278 -0.2470 -0.4018 0.0071;-0.1502 -0.6151 -0.0072 0.4340 -0.2470 -1.1389 0.2355
-0.1603;-0.1999 0.2243 -0.4676 0.1521 -0.4018 0.2355 -0.5051 -0.6262;-0.1454 -0.0636 -0.1029
-0.4875 0.0071 -0.1603 -0.6262 -1.0644]

R2=[-0.0518 -0.1286 -0.1466 0.4213 0.5847 -0.0959 -0.5613 0.3927;-0.1286 -0.8158 -0.8606 -
0.2410 0.1049 0.0100 -0.5786 -0.1306;-0.1466 -0.8606 0.7076 0.9040 -0.0241 0.4698 -0.6583
0.2112;0.4213 -0.2410 0.9040 0.0170 0.4588 0.0332 0.5334 -0.0496;0.5847 0.1049 -0.0241
0.4588 -0.2149 -0.0262 -0.1048 -0.0890;-0.0959 0.0100 0.4698 0.0332 -0.0262 0.0251 0.7434
0.1086;-0.5613 -0.5786 -0.6583 0.5334 -0.1048 0.7434 0.6282 0.4931;0.3927 -0.1306 0.2112 -
0.0496 -0.0890 0.1086 0.4931 -0.8106]

R3=[-0.3248 0.0246 0.3610 0.3424 0.5877 0.0498 -0.6765 0.1308;0.0246 0.4040 -0.0163 -
0.8197 -0.1471 0.1038 0.1989 -0.0057;0.3610 -0.0163 0.6805 -0.4158 -0.5448 -0.0874 0.0079
0.1546;0.3424 -0.8197 -0.4158 0.1379 -0.4274 0.2818 0.0928 0.5071;0.5877 -0.1471 -0.5448 -
0.4274 -0.7594 -0.1383 0.2243 -0.2369;0.0498 0.1038 -0.0874 0.2818 -0.1383 0.4073 -0.0910 -
0.3141;-0.6765 0.1989 0.0079 0.0928 0.2243 -0.0910 -1.1254 0.5100;0.1308 -0.0057 0.1546
0.5071 -0.2369 -0.3141 0.5100 -0.5771]

R4=[-0.9138 -0.3432 -0.2390 0.0490 0.2379 0.2096 -0.1793 0.2929;-0.3432 0.1388 -0.8071
0.1522 -0.3049 0.1160 0.9472 -0.1042;-0.2390 -0.8071 -0.9204 -0.1288 -0.0079 -0.2965 0.4508
0.0479;0.0490 0.1522 -0.1288 -1.0087 0.0074 0.2619 0.5102 -0.1520;0.2379 -0.3049 -0.0079
0.0074 0.2881 -0.4633 0.6843 -0.0025;0.2096 0.1160 -0.2965 0.2619 -0.4633 -0.4428 0.2378
0.5371;-0.1793 0.9472 0.4508 0.5102 0.6843 0.2378 -0.8055 -0.3302;0.2929 -0.1042 0.0479 -
0.1520 -0.0025 0.5371 -0.3302 -0.3291]

Benders Method is applied to the BMI problem

The method lasts 4.2315 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.3259 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9567 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 4 in this batch has the following matrices (Rs)

R1=[0.7504 -0.8600 0.2634 0.6755 -0.0807 0.6017 0.7004 -0.3827;-0.8600 -0.6821 0.1651 0.1099 -0.2723 -0.3113 0.0265 -0.4115;0.2634 0.1651 0.4479 -0.5361 0.0300 0.0339 -0.5250 0.2401;0.6755 0.1099 -0.5361 -0.3781 -0.2141 0.4124 0.1053 -0.1394;-0.0807 -0.2723 0.0300 -0.2141 -0.0804 -0.2357 0.5995 0.0141;0.6017 -0.3113 0.0339 0.4124 -0.2357 -0.8717 0.1557 -0.2181;0.7004 0.0265 -0.5250 0.1053 0.5995 0.1557 0.3804 -0.2891;-0.3827 -0.4115 0.2401 -0.1394 0.0141 -0.2181 -0.2891 -1.0581]

R2=[-0.0190 -0.3680 -0.1732 0.2839 0.6387 0.3952 0.1409 -0.0453;-0.3680 0.3779 0.7525 -0.2490 0.3249 0.1136 -0.5409 0.4419;-0.1732 0.7525 0.2678 -0.0633 -0.0372 -0.3680 -0.2133 -0.0132;0.2839 -0.2490 -0.0633 -0.4313 0.1114 0.0975 -0.1839 0.4692;0.6387 0.3249 -0.0372 0.1114 0.3004 0.1020 -0.2952 0.8137;0.3952 0.1136 -0.3680 0.0975 0.1020 0.4851 0.0029 -0.5955;0.1409 -0.5409 -0.2133 -0.1839 -0.2952 0.0029 -0.4721 -0.1591;-0.0453 0.4419 -0.0132 0.4692 0.8137 -0.5955 -0.1591 0.0357]

R3=[-0.6028 -0.2750 -0.0547 0.1576 -0.7978 -0.3013 0.4061 0.0844;-0.2750 -0.4509 0.8855 -0.1356 0.2879 -0.3118 0.5685 0.0391;-0.0547 0.8855 -0.0305 -0.0550 -0.8343 -0.7197 -0.4812 -0.4970;0.1576 -0.1356 -0.0550 0.4847 -0.0014 0.6590 -0.3354 0.0412;-0.7978 0.2879 -0.8343 -0.0014 0.3532 -0.2677 -0.3854 -0.5547;-0.3013 -0.3118 -0.7197 0.6590 -0.2677 -0.5644 -0.3608 -0.1444;0.4061 0.5685 -0.4812 -0.3354 -0.3854 -0.3608 -0.3010 0.1071;0.0844 0.0391 -0.4970 0.0412 -0.5547 -0.1444 0.1071 -0.5323]

R4=[-0.0589 -0.7188 0.2031 0.2956 -0.2223 0.0235 0.0044 0.1765;-0.7188 -0.5037 -0.1392 0.4407 -0.1004 0.2075 0.0845 -0.4488;0.2031 -0.1392 0.7929 0.5512 0.7571 -0.0854 -0.3859 0.3428;0.2956 0.4407 0.5512 -1.0791 -0.6287 -0.1006 0.6165 0.3475;-0.2223 -0.1004 0.7571 -0.6287 0.7804 0.1682 -0.4889 -0.4250;0.0235 0.2075 -0.0854 -0.1006 0.1682 -0.6890 0.6169

0.3837;0.0044 0.0845 -0.3859 0.6165 -0.4889 0.6169 -0.8661 -0.2342;0.1765 -0.4488 0.3428
0.3475 -0.4250 0.3837 -0.2342 0.2888]

Benders Method is applied to the BMI problem

The method lasts 4.2006 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.6580 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.0020 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 5 in this batch has the following matrices (Rs)

R1=[-0.6641 0.0338 -0.3732 0.0479 0.3601 -0.3490 -0.0076 -0.6732;0.0338 0.2596 0.1838
0.1617 0.0079 -0.5118 0.3156 0.2951;-0.3732 0.1838 0.4232 0.3488 0.4734 0.1156 -0.0732 -
0.3788;0.0479 0.1617 0.3488 -1.1616 -0.6606 0.7361 -0.7059 -0.0289;0.3601 0.0079 0.4734 -
0.6606 0.6256 0.1869 0.3575 0.6098;-0.3490 -0.5118 0.1156 0.7361 0.1869 -0.7410 0.2371 -

0.5204;-0.0076 0.3156 -0.0732 -0.7059 0.3575 0.2371 0.5701 -0.1691;-0.6732 0.2951 -0.3788 -
0.0289 0.6098 -0.5204 -0.1691 -0.9768]

R2=[-0.6257 -0.0396 -0.2802 0.8072 0.0714 -0.0542 -0.4340 0.4311;-0.0396 -0.5623 -0.7993 -
0.2456 0.3724 -0.2789 -0.3913 -0.2808;-0.2802 -0.7993 -0.1247 0.3255 -0.0142 -0.0573 0.0698
0.0073;0.8072 -0.2456 0.3255 0.3018 0.0325 -0.3332 -0.1968 0.2786;0.0714 0.3724 -0.0142
0.0325 0.3449 -0.0800 0.1214 -0.7878;-0.0542 -0.2789 -0.0573 -0.3332 -0.0800 -0.8116 -0.5081
0.1485;-0.4340 -0.3913 0.0698 -0.1968 0.1214 -0.5081 0.0074 0.3454;0.4311 -0.2808 0.0073
0.2786 -0.7878 0.1485 0.3454 -0.9428]

R3=[-0.5893 -0.0490 -0.1799 0.2166 -0.1807 -0.1142 0.5492 -0.7451;-0.0490 0.2275 -0.3118 -
0.1452 0.6002 -0.0341 0.2917 -0.0430;-0.1799 -0.3118 -0.3714 -0.0666 0.1411 -0.0288 0.1774 -
0.6133;0.2166 -0.1452 -0.0666 0.1637 0.5273 -0.1155 0.7289 0.1924;-0.1807 0.6002 0.1411
0.5273 -0.8602 0.6819 -0.0364 -0.5301;-0.1142 -0.0341 -0.0288 -0.1155 0.6819 0.7502 0.1834
0.1492;0.5492 0.2917 0.1774 0.7289 -0.0364 0.1834 -0.6534 -0.2927;-0.7451 -0.0430 -0.6133
0.1924 -0.5301 0.1492 -0.2927 -1.1000]

R4=[-0.8570 -0.5384 0.0526 0.0298 -0.8627 0.4234 0.7489 0.4919;-0.5384 -0.4551 -0.3990
0.0686 0.2209 0.5617 -0.2092 -0.4971;0.0526 -0.3990 -0.9476 -0.1136 0.1289 -0.3213 -0.4104
0.0862;0.0298 0.0686 -0.1136 0.2888 -0.5909 -0.2605 -0.4041 -0.5030;-0.8627 0.2209 0.1289 -
0.5909 -0.7802 0.8897 0.2921 0.4146;0.4234 0.5617 -0.3213 -0.2605 0.8897 -0.5017 -0.2824
0.7124;0.7489 -0.2092 -0.4104 -0.4041 0.2921 -0.2824 -0.2963 -0.0879;0.4919 -0.4971 0.0862 -
0.5030 0.4146 0.7124 -0.0879 0.3718]

Benders Method is applied to the BMI problem

The method lasts 2.8595 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.2037 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.0410 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 6 in this batch has the following matrices (Rs)

R1=[-0.6982 -0.1181 -0.0186 -0.0658 0.0327 -0.0213 0.0866 -0.3078;-0.1181 0.4004 -0.3021
0.0214 0.7212 -0.3769 0.0180 -0.1152;-0.0186 -0.3021 0.7355 0.1074 -0.0288 0.2035 0.1853 -
0.0503;-0.0658 0.0214 0.1074 -0.5055 -0.4382 -0.5098 0.2035 -0.4828;0.0327 0.7212 -0.0288 -
0.4382 0.1628 -0.0003 -0.3699 0.5000;-0.0213 -0.3769 0.2035 -0.5098 -0.0003 -0.8793 -0.1386 -
-0.0968;0.0866 0.0180 0.1853 0.2035 -0.3699 -0.1386 0.4897 0.1390;-0.3078 -0.1152 -0.0503 -
0.4828 0.5000 -0.0968 0.1390 -0.9129]

R2=[-0.6218 0.1054 0.6439 0.3627 -0.3191 -0.7253 0.0109 -0.0949;0.1054 -0.7306 -0.2823
0.4569 -0.2179 -0.1608 -0.7619 -0.0063;0.6439 -0.2823 -0.6498 -0.7263 0.1536 0.5416 -0.3892
-0.3505;0.3627 0.4569 -0.7263 -0.7260 -0.3178 0.4843 0.7548 0.0335;-0.3191 -0.2179 0.1536 -
0.3178 -0.5093 0.0557 -0.0609 -0.0123;-0.7253 -0.1608 0.5416 0.4843 0.0557 -0.7616 0.1602
0.6654;0.0109 -0.7619 -0.3892 0.7548 -0.0609 0.1602 0.5774 -0.2439;-0.0949 -0.0063 -0.3505
0.0335 -0.0123 0.6654 -0.2439 -0.3114]

R3=[0.4243 0.0622 0.0127 -0.1932 0.6813 0.0944 -0.3426 -0.0576;0.0622 -0.5064 0.0050
0.2541 -0.4960 -0.8249 -0.5679 0.3353;0.0127 0.0050 -0.2210 0.1156 0.2659 0.0647 0.4157
0.1483;-0.1932 0.2541 0.1156 -0.9289 -0.8596 -0.7464 0.2163 0.6325;0.6813 -0.4960 0.2659 -
0.8596 -0.3558 0.0131 -0.1073 0.7250;0.0944 -0.8249 0.0647 -0.7464 0.0131 0.2693 0.1354 -
0.0770;-0.3426 -0.5679 0.4157 0.2163 -0.1073 0.1354 0.0541 -0.3790;-0.0576 0.3353 0.1483
0.6325 0.7250 -0.0770 -0.3790 0.3301]

R4=[-0.9152 0.6555 0.1080 0.5095 0.4268 0.1169 0.0661 0.2252;0.6555 0.6872 -0.5808 0.7866
-0.3608 -0.4674 0.3409 0.7897;0.1080 -0.5808 -0.6074 0.5373 0.1231 0.4344 -0.4665
0.5396;0.5095 0.7866 0.5373 -0.4374 0.1444 0.3451 0.0042 -0.0472;0.4268 -0.3608 0.1231
0.1444 -0.3520 -0.3448 -0.1368 0.6109;0.1169 -0.4674 0.4344 0.3451 -0.3448 -0.5648 0.2250

0.7131;0.0661 0.3409 -0.4665 0.0042 -0.1368 0.2250 -1.0644 0.2946;0.2252 0.7897 0.5396 -
0.0472 0.6109 0.7131 0.2946 -0.8177]

Benders Method is applied to the BMI problem

The method lasts 4.4715 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.2268 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.0001 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[0.3839 -0.2814 -0.8411 0.0190 0.7178 0.2196 0.1014 -0.2979;-0.2814 -0.3100 0.4142 -
0.0302 -0.5931 0.7048 0.0396 -0.0527;-0.8411 0.4142 0.2709 -0.2384 0.0018 -0.4313 -0.2248
0.2367;0.0190 -0.0302 -0.2384 -0.6356 -0.1801 -0.2936 0.2626 0.1425;0.7178 -0.5931 0.0018 -
0.1801 -1.1440 0.1243 0.5038 -0.0183;0.2196 0.7048 -0.4313 -0.2936 0.1243 -0.7404 -0.1058 -

0.7443;0.1014 0.0396 -0.2248 0.2626 0.5038 -0.1058 -0.2677 0.1401;-0.2979 -0.0527 0.2367
0.1425 -0.0183 -0.7443 0.1401 -0.8137]

R2=[-0.3448 0.1741 -0.1085 -0.3990 0.5269 -0.1476 -0.6498 0.2859;0.1741 -0.3867 0.0718 -
0.1883 -0.4309 0.3708 0.1418 -0.2166;-0.1085 0.0718 -0.6209 -0.7241 0.2174 0.0458 -0.9339
0.0446;-0.3990 -0.1883 -0.7241 0.2479 -0.6753 -0.0401 -0.0129 0.0380;0.5269 -0.4309 0.2174 -
0.6753 0.6817 0.2700 -0.0698 -0.5586;-0.1476 0.3708 0.0458 -0.0401 0.2700 0.2168 -0.2227
0.1381;-0.6498 0.1418 -0.9339 -0.0129 -0.0698 -0.2227 -0.6531 0.6684;0.2859 -0.2166 0.0446
0.0380 -0.5586 0.1381 0.6684 -0.8792]

R3=[-0.0429 0.1778 0.4205 -0.6139 -0.0431 0.0186 0.4366 0.0438;0.1778 -1.0028 0.5255
0.0531 -0.3844 -0.1294 -0.0718 -0.0726;0.4205 0.5255 -1.0132 -0.5138 -0.5966 -0.3870 -0.6703
0.0350;-0.6139 0.0531 -0.5138 -1.1805 0.0222 0.0823 0.0257 -0.1913;-0.0431 -0.3844 -0.5966
0.0222 -0.6443 0.4888 -0.7114 0.5106;0.0186 -0.1294 -0.3870 0.0823 0.4888 -0.2859 -0.6887 -
0.5447;0.4366 -0.0718 -0.6703 0.0257 -0.7114 -0.6887 0.3404 -0.7792;0.0438 -0.0726 0.0350 -
0.1913 0.5106 -0.5447 -0.7792 0.5362]

R4=[-0.5647 0.3867 0.1252 0.2617 0.0481 -0.1122 -0.4744 -0.4535;0.3867 -0.0016 -0.8229
0.8293 -0.5495 -0.0464 -0.3260 0.0361;0.1252 -0.8229 -0.6654 0.0817 0.4373 0.5625 0.0110 -
0.1007;0.2617 0.8293 0.0817 0.3454 -0.3217 -0.4772 -0.1613 -0.1594;0.0481 -0.5495 0.4373 -
0.3217 -0.1969 -0.0583 -0.4284 0.2794;-0.1122 -0.0464 0.5625 -0.4772 -0.0583 0.0412 0.1767 -
0.0172;-0.4744 -0.3260 0.0110 -0.1613 -0.4284 0.1767 -0.0273 0.0968;-0.4535 0.0361 -0.1007 -
0.1594 0.2794 -0.0172 0.0968 0.7655]

Benders Method is applied to the BMI problem

The method lasts 7.3202 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.2489 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9827 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 8 in this batch has the following matrices (Rs)

R1=[0.3603 0.0191 -0.5361 -0.0084 0.0598 0.5393 -0.0411 0.2658;0.0191 -0.8496 -0.8427 -0.2472 0.3395 0.1960 0.2006 -0.4629;-0.5361 -0.8427 -1.0563 -0.6329 0.3565 -0.8033 0.0313 -0.3769;-0.0084 -0.2472 -0.6329 -0.4020 -0.0993 0.1686 -0.3695 -0.6102;0.0598 0.3395 0.3565 -0.0993 -0.2303 0.6016 -0.2837 -0.0549;0.5393 0.1960 -0.8033 0.1686 0.6016 -0.9212 0.0707 0.6017;-0.0411 0.2006 0.0313 -0.3695 -0.2837 0.0707 0.6356 0.3839;0.2658 -0.4629 -0.3769 -0.6102 -0.0549 0.6017 0.3839 0.3558]

R2=[0.3279 0.1348 0.0636 0.6626 -0.2820 -0.5950 -0.5161 0.1759;0.1348 0.3223 0.2490 0.2583 -0.3694 0.1115 0.0120 -0.0229;0.0636 0.2490 0.5642 -0.6817 -0.0619 0.1900 0.2637 -0.5920;0.6626 0.2583 -0.6817 -0.6837 -0.7496 -0.1946 -0.5236 0.5537;-0.2820 -0.3694 -0.0619 -0.7496 -0.8102 -0.2642 -0.2684 -0.2596;-0.5950 0.1115 0.1900 -0.1946 -0.2642 -0.3456 0.5246 0.7866;-0.5161 0.0120 0.2637 -0.5236 -0.2684 0.5246 -0.7451 -0.2471;0.1759 -0.0229 -0.5920 0.5537 -0.2596 0.7866 -0.2471 -0.9762]

R3=[-0.3387 -0.3818 0.1629 0.1671 0.7774 -0.5259 0.0434 0.1448;-0.3818 0.1442 -0.9019 -0.7891 -0.3282 0.8348 -0.0080 0.0452;0.1629 -0.9019 -1.1247 0.3582 0.4487 -0.3535 -0.0293 -0.4580;0.1671 -0.7891 0.3582 0.1639 0.1519 -0.0502 0.0874 -0.0872;0.7774 -0.3282 0.4487 0.1519 0.2232 0.1445 -0.2682 -0.2511;-0.5259 0.8348 -0.3535 -0.0502 0.1445 -0.5049 -0.0646 -0.8996;0.0434 -0.0080 -0.0293 0.0874 -0.2682 -0.0646 0.7535 -0.0864;0.1448 0.0452 -0.4580 -0.0872 -0.2511 -0.8996 -0.0864 -1.0088]

R4=[0.6987 -0.1311 -0.1813 0.3783 -0.7516 0.1191 0.3815 -0.6001;-0.1311 -1.0023 0.7880 -0.7919 0.8292 -0.2952 -0.3596 0.5407;-0.1813 0.7880 -1.0239 0.2255 0.1106 -0.0429 0.1094 -0.2818;0.3783 -0.7919 0.2255 -1.1051 0.4386 -0.1905 0.1206 -0.3862;-0.7516 0.8292 0.1106 0.4386 0.3017 -0.1231 -0.7719 -0.1601;0.1191 -0.2952 -0.0429 -0.1905 -0.1231 -0.1408 -0.0132

-0.8283;0.3815 -0.3596 0.1094 0.1206 -0.7719 -0.0132 -0.3285 0.3102;-0.6001 0.5407 -0.2818 -
0.3862 -0.1601 -0.8283 0.3102 -0.1570]

Benders Method is applied to the BMI problem

The method lasts 4.1993 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.2476 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9943 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 9 in this batch has the following matrices (Rs)

R1=[0.3701 0.5683 0.2531 0.3478 -0.1033 -0.1655 -0.0089 -0.0013;0.5683 -0.2413 -0.0781 -
0.2312 0.2749 -0.0364 -0.3691 -0.2421;0.2531 -0.0781 0.0348 -0.0675 -0.3027 0.0102 0.2201
0.3672;0.3478 -0.2312 -0.0675 -1.1107 0.0174 -0.1912 0.6636 -0.0097;-0.1033 0.2749 -0.3027
0.0174 -0.1521 -0.3785 -0.0850 0.1063;-0.1655 -0.0364 0.0102 -0.1912 -0.3785 -0.2141 -0.0950

0.0639;-0.0089 -0.3691 0.2201 0.6636 -0.0850 -0.0950 0.7157 0.8861;-0.0013 -0.2421 0.3672 -
0.0097 0.1063 0.0639 0.8861 -0.8470]

R2=[0.3181 0.0206 0.0948 0.0105 -0.4005 0.2725 0.1672 0.2169;0.0206 -0.2303 -0.3758 -
0.4979 0.2006 -0.7534 0.7180 -0.7161;0.0948 -0.3758 0.6699 0.3092 0.2843 0.6158 0.0971 -
0.5230;0.0105 -0.4979 0.3092 -0.5379 -0.2023 -0.8872 -0.7481 -0.0772;-0.4005 0.2006 0.2843 -
0.2023 -0.7276 -0.3015 0.3453 -0.5006;0.2725 -0.7534 0.6158 -0.8872 -0.3015 0.1625 0.1531 -
0.5661;0.1672 0.7180 0.0971 -0.7481 0.3453 0.1531 0.3058 -0.0255;0.2169 -0.7161 -0.5230 -
0.0772 -0.5006 -0.5661 -0.0255 -0.5886]

R3=[-0.5220 -0.3653 0.5431 -0.2701 -0.0398 0.1739 -0.3261 0.2460;-0.3653 -1.1458 -0.2659
0.1346 0.7399 -0.1979 -0.3972 0.0470;0.5431 -0.2659 -0.0334 0.2973 0.2997 -0.0419 -0.1528
0.7074;-0.2701 0.1346 0.2973 -0.3619 -0.2196 -0.7957 -0.3159 0.5696;-0.0398 0.7399 0.2997 -
0.2196 -0.7577 -0.2802 -0.1960 -0.8916;0.1739 -0.1979 -0.0419 -0.7957 -0.2802 -0.3911 0.0847
-0.6035;-0.3261 -0.3972 -0.1528 -0.3159 -0.1960 0.0847 0.5032 -0.6425;0.2460 0.0470 0.7074
0.5696 -0.8916 -0.6035 -0.6425 -0.6558]

R4=[-0.1954 -0.0568 -0.2603 0.1936 0.2900 -0.8370 0.0635 -0.3351;-0.0568 -0.3031 -0.2451
0.3230 0.5327 -0.3050 -0.1851 0.2308;-0.2603 -0.2451 0.3485 -0.6135 0.1577 0.1063 0.0095
0.0729;0.1936 0.3230 -0.6135 0.7654 -0.1270 0.5825 -0.1699 -0.4226;0.2900 0.5327 0.1577 -
0.1270 -0.6487 -0.0447 0.3471 0.7936;-0.8370 -0.3050 0.1063 0.5825 -0.0447 -0.3614 -0.0447
0.5352;0.0635 -0.1851 0.0095 -0.1699 0.3471 -0.0447 0.4937 -0.2401;-0.3351 0.2308 0.0729 -
0.4226 0.7936 0.5352 -0.2401 0.1167]

Benders Method is applied to the BMI problem

The method lasts 7.1786 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.2567 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9901 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[-0.2147 0.3063 -0.7632 -0.5574 -0.0896 0.5654 -0.1417 -0.5708;0.3063 -1.0633 0.5134 0.8126 0.0369 0.4051 0.5393 -0.7083;-0.7632 0.5134 0.3950 0.2968 -0.1201 0.3433 0.5533 -0.1145;-0.5574 0.8126 0.2968 -0.7964 -0.7154 0.3721 -0.2639 0.8761;-0.0896 0.0369 -0.1201 -0.7154 0.4263 -0.4317 0.0984 0.1331;0.5654 0.4051 0.3433 0.3721 -0.4317 -0.5898 -0.3121 0.2519;-0.1417 0.5393 0.5533 -0.2639 0.0984 -0.3121 -0.9794 -0.4828;-0.5708 -0.7083 -0.1145 0.8761 0.1331 0.2519 -0.4828 -1.0898]

R2=[-0.5126 0.4896 0.0390 0.5010 -0.5570 0.2487 0.1211 0.2605;0.4896 -0.8635 -0.3287 0.1277 -0.0475 -0.1597 0.0146 -0.0108;0.0390 -0.3287 0.4096 -0.2716 -0.6532 -0.1091 0.1348 0.2416;0.5010 0.1277 -0.2716 -0.0775 0.1082 -0.3244 0.5898 -0.0333;-0.5570 -0.0475 -0.6532 0.1082 -0.2219 -0.7299 0.2536 0.7265;0.2487 -0.1597 -0.1091 -0.3244 -0.7299 -0.7827 -0.0615 -0.1685;0.1211 0.0146 0.1348 0.5898 0.2536 -0.0615 -1.0835 0.2628;0.2605 -0.0108 0.2416 -0.0333 0.7265 -0.1685 0.2628 0.5363]

R3=[-0.6087 -0.1329 0.3335 -0.2344 0.6557 0.3362 -0.1124 -0.6489;-0.1329 0.7251 -0.7276 0.0221 0.4256 0.5899 0.4215 0.2169;0.3335 -0.7276 -0.7403 -0.0221 0.4635 0.4384 -0.3916 0.8859;-0.2344 0.0221 -0.0221 -0.5714 0.3340 0.4988 0.1122 -0.3006;0.6557 0.4256 0.4635 0.3340 0.1987 -0.4841 0.3191 0.2578;0.3362 0.5899 0.4384 0.4988 -0.4841 0.6405 0.4764 0.4757;-0.1124 0.4215 -0.3916 0.1122 0.3191 0.4764 -0.6176 0.3872;-0.6489 0.2169 0.8859 -0.3006 0.2578 0.4757 0.3872 -1.0670]

R4=[0.3906 0.9062 0.0628 0.2252 0.1144 0.4254 -0.8415 -0.5849;0.9062 -0.5752 -0.0222 -0.1566 0.1428 -0.1629 -0.7556 -0.4762;0.0628 -0.0222 -0.1395 0.2431 0.2820 -0.1248 -0.1696 -0.8921;0.2252 -0.1566 0.2431 0.5740 -0.0959 0.1072 -0.0503 0.4071;0.1144 0.1428 0.2820 -0.0959 -0.6709 0.0662 -0.2199 0.1480;0.4254 -0.1629 -0.1248 0.1072 0.0662 0.3820 0.2441

0.1002;-0.8415 -0.7556 -0.1696 -0.0503 -0.2199 0.2441 -0.7650 -0.2495;-0.5849 -0.4762 -
0.8921 0.4071 0.1480 0.1002 -0.2495 -0.1363]

Benders Method is applied to the BMI problem

The method lasts 4.2235 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.4738 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 0.9557 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

From here, 10 BMIs in the batch related to $n=10$ and $r=1$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

$R1 = [-0.5649 \ 0.5002 \ -0.9185 \ 0.1214 \ 0.1493 \ -0.5240 \ 0.5317 \ 0.1540 \ 0.1078 \ -0.7364; 0.5002 \ -$
 $0.0758 \ -0.1335 \ -0.4043 \ 0.3276 \ 0.4760 \ -0.1655 \ -0.3669 \ -0.0714 \ -0.0833; -0.9185 \ -0.1335 \ -0.5714$

0.3549 -0.1827 0.1818 -0.1262 0.1649 -0.4208 -0.8757;0.1214 -0.4043 0.3549 -0.2351 0.3194 -
0.1660 -0.4701 -0.1798 -0.3549 -0.0442;0.1493 0.3276 -0.1827 0.3194 -0.2540 0.1139 0.1587 -
0.0173 0.4398 -0.2824;-0.5240 0.4760 0.1818 -0.1660 0.1139 0.7003 0.2237 -0.2984 0.1758 -
0.6738;0.5317 -0.1655 -0.1262 -0.4701 0.1587 0.2237 -0.3285 0.7601 -0.3823 0.5803;0.1540 -
0.3669 0.1649 -0.1798 -0.0173 -0.2984 0.7601 -0.8023 0.1769 -0.6937;0.1078 -0.0714 -0.4208 -
0.3549 0.4398 0.1758 -0.3823 0.1769 0.0590 -0.0428;-0.7364 -0.0833 -0.8757 -0.0442 -0.2824 -
0.6738 0.5803 -0.6937 -0.0428 -0.8226]

Benders Method is applied to the BMI problem

The method lasts 7.5223 seconds

The method found a feasible solution given in the following

X=[0.5847 0.0394 -0.0939 -0.0500 0.0335 -0.0470 0.0522 0.0179 0.0503 0.0264;0.0394 0.5820 -
0.0335 -0.0495 0.0509 0.1032 0.0178 -0.0004 0.0587 -0.0366;-0.0939 -0.0335 0.6056 0.0512 -
0.0315 0.0721 -0.0589 -0.0212 -0.0501 -0.0370;-0.0500 -0.0495 0.0512 0.5403 -0.0343 -0.0238
-0.0281 -0.0070 -0.0443 0.0046;0.0335 0.0509 -0.0315 -0.0343 0.5329 0.0508 0.0171 0.0023
0.0395 -0.0167;-0.0470 0.1032 0.0721 -0.0238 0.0508 0.7716 -0.0418 -0.0270 0.0414 -
0.1105;0.0522 0.0178 -0.0589 -0.0281 0.0171 -0.0418 0.5329 0.0119 0.0274 0.0212;0.0179 -
0.0004 -0.0212 -0.0070 0.0023 -0.0270 0.0119 0.5050 0.0058 0.0122;0.0503 0.0587 -0.0501 -
0.0443 0.0395 0.0414 0.0274 0.0058 0.5495 -0.0115;0.0264 -0.0366 -0.0370 0.0046 -0.0167 -
0.1105 0.0212 0.0122 -0.0115 0.5457]

Y=[-0.4514 -0.1213 0.1526 0.0016 -0.0955 0.1187 -0.0929 -0.0870 -0.0236 0.0861;-0.1213 -
0.4871 0.0804 0.0832 -0.0807 -0.1430 0.0312 0.1124 0.0149 0.0409;0.1526 0.0804 -0.4224 -
0.0941 0.0452 -0.0980 0.0733 -0.0609 0.1202 0.1576;0.0016 0.0832 -0.0941 -0.4407 -0.0803
0.0832 0.1334 0.0488 0.0885 0.0602;-0.0955 -0.0807 0.0452 -0.0803 -0.4063 -0.0452 0.0031 -
0.0111 -0.1273 0.0763;0.1187 -0.1430 -0.0980 0.0832 -0.0452 -0.7181 -0.0263 0.0471 -0.0383
0.1339;-0.0929 0.0312 0.0733 0.1334 0.0031 -0.0263 -0.4936 -0.1629 0.0946 -0.0557;-0.0870
0.1124 -0.0609 0.0488 -0.0111 0.0471 -0.1629 -0.3731 -0.0240 0.1262;-0.0236 0.0149 0.1202
0.0885 -0.1273 -0.0383 0.0946 -0.0240 -0.5426 0.0286;0.0860 0.0409 0.1576 0.0603 0.0763
0.1339 -0.0557 0.1262 0.0286 -0.4399]

Path Method is applied to the BMI problem

The method lasts 3.5912 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.1173 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[-0.2940 -0.2744 0.0618 0.0409 0.0055 -0.3571 -0.3347 -0.1095 -0.1739 -0.2618;-0.2744 -0.2152 -0.7112 0.1281 -0.4634 0.1906 -0.2092 0.5634 0.6294 -0.7357;0.0618 -0.7112 0.1460 -0.0722 0.0985 0.2745 -0.4081 -0.3132 0.7987 -0.2569;0.0409 0.1281 -0.0722 -0.8650 -0.4030 -0.2293 -0.1629 -0.6739 -0.0760 -0.3176;0.0055 -0.4634 0.0985 -0.4030 0.0626 -0.3467 -0.3644 -0.6164 -0.0241 -0.1805;-0.3571 0.1906 0.2745 -0.2293 -0.3467 0.6781 -0.1017 0.2148 -0.5444 0.2938;-0.3347 -0.2092 -0.4081 -0.1629 -0.3644 -0.1017 0.0922 0.6466 -0.1157 -0.8556;-0.1095 0.5634 -0.3132 -0.6739 -0.6164 0.2148 0.6466 0.0513 0.0147 0.5765;-0.1739 0.6294 0.7987 -0.0760 -0.0241 -0.5444 -0.1157 0.0147 0.1246 0.0188;-0.2618 -0.7357 -0.2569 -0.3176 -0.1805 0.2938 -0.8556 0.5765 0.0188 -0.6587]

Benders Method is applied to the BMI problem

The method lasts 5.2519 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.9145 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.1879 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 3 in this batch has the following matrices (Rs)

R1=[-0.8897 -0.3628 -0.8292 0.0813 0.0146 -0.0132 0.1106 0.1380 0.1857 -0.6611;-0.3628 -
0.4732 -0.2805 -0.0924 -0.2257 0.4495 0.4170 0.5681 -0.6783 0.4051;-0.8292 -0.2805 0.4491 -
0.3522 -0.0443 -0.7827 0.0291 0.4143 0.2298 0.4014;0.0813 -0.0924 -0.3522 -0.2702 -0.1126
0.2055 0.8618 0.2318 -0.4166 0.4587;0.0146 -0.2257 -0.0443 -0.1126 -0.4811 0.0113 -0.0996
0.0118 -0.2667 0.2345;-0.0132 0.4495 -0.7827 0.2055 0.0113 -1.1329 -0.4198 -0.0909 -0.6070
0.7096;0.1106 0.4170 0.0291 0.8618 -0.0996 -0.4198 -1.1761 0.2515 0.5752 0.0308;0.1380
0.5681 0.4143 0.2318 0.0118 -0.0909 0.2515 -1.0283 -0.8987 -0.3396;0.1857 -0.6783 0.2298 -
0.4166 -0.2667 -0.6070 0.5752 -0.8987 -0.4842 0.3482;-0.6611 0.4051 0.4014 0.4587 0.2345
0.7096 0.0308 -0.3396 0.3482 -0.3070]

Benders Method is applied to the BMI problem

The method lasts 5.3443 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.8106 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.1672 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 4 in this batch has the following matrices (Rs)

R1=[-0.9701 -0.0483 0.0886 0.1290 0.3040 0.0528 -0.8472 0.0907 -0.8723 0.0008;-0.0483 -
0.5317 -0.3464 -0.2682 0.0941 -0.2024 0.3365 0.3872 0.9279 -0.2445;0.0886 -0.3464 -0.8641 -
0.2674 -0.1216 -0.2359 -0.1306 0.6111 0.3166 -0.0420;0.1290 -0.2682 -0.2674 -0.8289 0.4638 -
0.1290 0.3498 0.4727 -0.3774 0.2463;0.3040 0.0941 -0.1216 0.4638 0.5019 0.0116 -0.0191 -
0.7150 0.3636 -0.0030;0.0528 -0.2024 -0.2359 -0.1290 0.0116 -1.0862 0.2362 -0.1046 -0.0996
0.8784;-0.8472 0.3365 -0.1306 0.3498 -0.0191 0.2362 0.5328 -0.0810 0.1620 0.1359;0.0907
0.3872 0.6111 0.4727 -0.7150 -0.1046 -0.0810 -0.1084 0.0446 0.1311;-0.8723 0.9279 0.3166 -
0.3774 0.3636 -0.0996 0.1620 0.0446 -0.3982 -0.3656;0.0008 -0.2445 -0.0420 0.2463 -0.0030
0.8784 0.1359 0.1311 -0.3656 -1.1759]

Benders Method is applied to the BMI problem

The method lasts 8.2403 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.8819 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.1284 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 5 in this batch has the following matrices (Rs)

R1=[-0.6189 -0.2927 -0.1060 0.8013 -0.2235 0.2394 -0.0109 -0.2034 0.5653 0.1667;-0.2927 -
0.8271 0.2719 0.5387 0.0240 0.0296 0.5133 -0.5185 0.1666 -0.3890;-0.1060 0.2719 -0.1974
0.3484 -0.5710 -0.6329 -0.4784 0.1696 -0.1159 0.9713;0.8013 0.5387 0.3484 0.3208 -0.1722
0.6609 -0.3409 0.0899 -0.2233 -0.6675;-0.2235 0.0240 -0.5710 -0.1722 0.4356 0.2033 0.1807 -
0.4623 0.6278 0.1060;0.2394 0.0296 -0.6329 0.6609 0.2033 -1.0077 0.4314 0.0142 0.6739 -
0.0560;-0.0109 0.5133 -0.4784 -0.3409 0.1807 0.4314 -0.4924 -0.0094 -0.2816 0.0826;-0.2034 -
0.5185 0.1696 0.0899 -0.4623 0.0142 -0.0094 0.3715 -0.4642 -0.0810;0.5653 0.1666 -0.1159 -
0.2233 0.6278 0.6739 -0.2816 -0.4642 -0.1410 -0.1994;0.1667 -0.3890 0.9713 -0.6675 0.1060 -
0.0560 0.0826 -0.0810 -0.1994 0.2361]

Benders Method is applied to the BMI problem

The method lasts 5.4428 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.0267 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.2310 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 6 in this batch has the following matrices (Rs)

R1=[-0.7797 -0.8805 -0.1798 -0.1864 0.1560 -0.3338 0.6449 0.2586 0.6812 0.6104;-0.8805
0.3824 0.3514 0.0815 -0.2776 -0.5629 0.0196 -0.2694 0.6709 0.3497;-0.1798 0.3514 0.6374 -
0.2613 0.3080 -0.3404 0.3003 0.4430 -0.4304 0.0220;-0.1864 0.0815 -0.2613 -0.7505 -0.0067 -
0.2564 -0.0085 0.3268 -0.3721 -0.4319;0.1560 -0.2776 0.3080 -0.0067 -0.1965 -0.5737 -0.4618
-0.0596 0.4151 0.4021;-0.3338 -0.5629 -0.3404 -0.2564 -0.5737 -0.4480 0.1010 0.6455 -0.1372
0.1265;0.6449 0.0196 0.3003 -0.0085 -0.4618 0.1010 0.4772 -0.5672 -0.2677 0.1835;0.2586 -
0.2694 0.4430 0.3268 -0.0596 0.6455 -0.5672 0.0006 0.0758 -0.3027;0.6812 0.6709 -0.4304 -

0.3721 0.4151 -0.1372 -0.2677 0.0758 -0.2559 0.6456;0.6104 0.3497 0.0220 -0.4319 0.4021
0.1265 0.1835 -0.3027 0.6456 -0.3868]

Benders Method is applied to the BMI problem

The method lasts 8.2298 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.6752 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.1233 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[-0.2354 0.4477 -0.1727 0.0686 0.6563 -0.8602 0.1886 -0.4959 -0.3551 0.1292;0.4477 -
0.3989 0.6657 -0.3903 -0.0320 -0.0260 -0.2904 0.5053 -0.3286 0.2658;-0.1727 0.6657 -1.1142
0.1050 0.1651 -0.2114 -0.0509 0.0642 0.9342 0.2540;0.0686 -0.3903 0.1050 -0.2463 -0.1077 -
0.2637 0.0621 0.8301 -0.2551 0.2897;0.6563 -0.0320 0.1651 -0.1077 -0.4675 -0.6617 0.4245 -

0.8630 -0.1564 -0.1211;-0.8602 -0.0260 -0.2114 -0.2637 -0.6617 0.1734 -0.1218 -0.4500 -
0.2249 0.6032;0.1886 -0.2904 -0.0509 0.0621 0.4245 -0.1218 0.7226 -0.1104 -0.0238 0.0100;-
0.4959 0.5053 0.0642 0.8301 -0.8630 -0.4500 -0.1104 0.7389 -0.6728 0.2356;-0.3551 -0.3286
0.9342 -0.2551 -0.1564 -0.2249 -0.0238 -0.6728 -1.0192 0.2205;0.1292 0.2658 0.2540 0.2897 -
0.1211 0.6032 0.0100 0.2356 0.2205 -0.3240]

Benders Method is applied to the BMI problem

The method lasts 5.2835 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.5977 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.1809 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 8 in this batch has the following matrices (Rs)

R1=[-0.4899 -0.2372 -0.1037 0.0335 -0.1516 -0.2943 -0.7747 0.0038 0.2816 0.2041;-0.2372 -0.4494 -0.0143 0.7455 -0.5135 -0.1057 0.0238 0.6573 0.1150 -0.0676;-0.1037 -0.0143 0.2699 -0.8707 0.0585 0.8006 0.1576 0.2688 0.0029 -0.2690;0.0335 0.7455 -0.8707 -0.8675 0.2702 -0.1170 0.1670 0.0488 -0.1829 -0.4206;-0.1516 -0.5135 0.0585 0.2702 0.4992 0.5400 -0.4634 0.3241 -0.0561 0.1013;-0.2943 -0.1057 0.8006 -0.1170 0.5400 -0.9293 -0.3452 -0.2099 0.3363 -0.4778;-0.7747 0.0238 0.1576 0.1670 -0.4634 -0.3452 -0.7516 -0.0987 -0.4676 -0.0080;0.0038 0.6573 0.2688 0.0488 0.3241 -0.2099 -0.0987 -0.4252 -0.5718 -0.1562;0.2816 0.1150 0.0029 -0.1829 -0.0561 0.3363 -0.4676 -0.5718 -0.7827 -0.1422;0.2041 -0.0676 -0.2690 -0.4206 0.1013 -0.4778 -0.0080 -0.1562 -0.1422 -0.9475]

Benders Method is applied to the BMI problem

The method lasts 5.3417 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.9278 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.2091 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 9 in this batch has the following matrices (Rs)

R1=[-0.2398 -0.7381 -0.1049 0.2943 0.2501 -0.2659 0.0945 0.1910 0.0947 0.4941;-0.7381 -
0.5978 -0.2874 0.1018 0.7613 -0.5591 0.6179 -0.2496 0.1397 -0.3812;-0.1049 -0.2874 0.1706 -
0.1238 0.4250 0.6703 -0.6242 0.7885 -0.3894 -0.1261;0.2943 0.1018 -0.1238 0.1053 0.1802
0.2887 0.3964 -0.1380 -0.3383 0.4764;0.2501 0.7613 0.4250 0.1802 -0.3296 0.7027 -0.0045 -
0.4394 0.0703 -0.2199;-0.2659 -0.5591 0.6703 0.2887 0.7027 0.1074 0.3786 -0.3770 0.5473 -
0.3831;0.0945 0.6179 -0.6242 0.3964 -0.0045 0.3786 -0.8812 0.2968 -0.6191 -0.4496;0.1910 -
0.2496 0.7885 -0.1380 -0.4394 -0.3770 0.2968 0.3591 0.5352 -0.5177;0.0947 0.1397 -0.3894 -
0.3383 0.0703 0.5473 -0.6191 0.5352 -0.6978 -0.7774;0.4941 -0.3812 -0.1261 0.4764 -0.2199 -
0.3831 -0.4496 -0.5177 -0.7774 0.7634]

Benders Method is applied to the BMI problem

The method lasts 5.2463 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.6523 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.1152 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[-0.7325 0.1164 0.6094 -0.1329 0.1308 -0.4046 0.2168 0.5280 -0.0087 0.3531;0.1164
0.4295 0.8251 0.1698 0.3755 0.1445 -0.2455 0.7993 0.0305 0.1506;0.6094 0.8251 -0.8206 -
0.2014 -0.6539 -0.0148 0.5575 -0.3691 0.0234 0.4984;-0.1329 0.1698 -0.2014 -0.3223 0.3142 -
0.4113 0.4201 -0.4978 -0.1409 0.1239;0.1308 0.3755 -0.6539 0.3142 0.3417 0.3135 0.4840 -
0.2611 0.2493 0.5118;-0.4046 0.1445 -0.0148 -0.4113 0.3135 -0.5318 0.5936 0.4857 -0.3260 -
0.8606;0.2168 -0.2455 0.5575 0.4201 0.4840 0.5936 0.4669 0.4978 0.2837 -0.4471;0.5280
0.7993 -0.3691 -0.4978 -0.2611 0.4857 0.4978 0.0544 -0.4349 0.0886;-0.0087 0.0305 0.0234 -
0.1409 0.2493 -0.3260 0.2837 -0.4349 0.4163 -0.3253;0.3531 0.1506 0.4984 0.1239 0.5118 -
0.8606 -0.4471 0.0886 -0.3253 0.1264]

Benders Method is applied to the BMI problem

The method lasts 8.3986 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.5174 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.1232 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

From here, 10 BMIs in the batch related to $n=10$ and $r=2$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

R1=[0.6080 0.7962 0.0103 -0.0508 -0.7803 -0.0908 -0.4417 -0.4847 0.0010 -0.5226;0.7962 0.4028 -0.4159 -0.4077 0.1242 -0.5080 -0.2147 0.1670 0.6584 0.2841;0.0103 -0.4159 -1.0722 -0.0790 0.2430 -0.4680 -0.3913 0.4308 0.2376 -0.4441;-0.0508 -0.4077 -0.0790 0.3825 -0.2926 0.2954 0.5987 -0.6093 0.7086 -0.2725;-0.7803 0.1242 0.2430 -0.2926 -1.1091 0.2643 -0.2397 -0.0133 0.6971 -0.1866;-0.0908 -0.5080 -0.4680 0.2954 0.2643 0.5765 -0.3691 -0.0449 0.0892 0.5835;-0.4417 -0.2147 -0.3913 0.5987 -0.2397 -0.3691 0.2173 -0.4576 0.3596 0.3325;-0.4847 0.1670 0.4308 -0.6093 -0.0133 -0.0449 -0.4576 0.5999 0.0315 0.0023;0.0010 0.6584 0.2376 0.7086 0.6971 0.0892 0.3596 0.0315 -0.5675 -0.4307;-0.5226 0.2841 -0.4441 -0.2725 -0.1866 0.5835 0.3325 0.0023 -0.4307 -0.0902]

R2=[-0.5365 -0.6172 0.0344 -0.1498 -0.1320 -0.0737 0.0549 -0.7383 -0.3655 0.2082;-0.6172 -0.9282 -0.3525 -0.4963 -0.1327 0.2188 0.7743 -0.0952 -0.4814 0.5536;0.0344 -0.3525 -0.0236 -0.2152 -0.3664 -0.0789 0.7726 -0.3156 0.0510 0.0450;-0.1498 -0.4963 -0.2152 0.2862 0.1567 -0.6324 -0.1247 0.0251 -0.2364 0.4186;-0.1320 -0.1327 -0.3664 0.1567 -0.9386 0.0170 0.1048 -0.7519 -0.7228 -0.0613;-0.0737 0.2188 -0.0789 -0.6324 0.0170 -0.6230 -0.2177 -0.2841 -0.1290 -0.6291;0.0549 0.7743 0.7726 -0.1247 0.1048 -0.2177 0.0611 0.2080 -0.0792 0.2708;-0.7383 -0.0952 -0.3156 0.0251 -0.7519 -0.2841 0.2080 -0.4107 0.0834 0.0981;-0.3655 -0.4814 0.0510 -0.2364 -0.7228 -0.1290 -0.0792 0.0834 -0.6433 -0.3844;0.2082 0.5536 0.0450 0.4186 -0.0613 -0.6291 0.2708 0.0981 -0.3844 -0.6505]

Benders Method is applied to the BMI problem

The method lasts 4.4754 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.9156 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.1324 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[0.4499 -0.7319 0.2441 0.1576 0.4888 -0.1498 -0.1194 0.0356 -0.5591 0.2802;-0.7319 -
0.4683 -0.0895 -0.8928 0.4686 -0.0713 -0.7099 0.3772 -0.5856 -0.2805;0.2441 -0.0895 -0.2994
-0.4619 -0.4203 -0.2918 -0.0544 0.5614 -0.2408 0.6557;0.1576 -0.8928 -0.4619 -0.7816 0.3776
0.1764 0.5602 -0.4688 -0.7193 -0.4916;0.4888 0.4686 -0.4203 0.3776 -0.2983 -0.8294 -0.7158
0.7900 -0.1949 0.0300;-0.1498 -0.0713 -0.2918 0.1764 -0.8294 -1.0153 -0.3701 -0.6853 -0.0434
-0.4090;-0.1194 -0.7099 -0.0544 0.5602 -0.7158 -0.3701 -1.0083 0.1483 0.4781 0.3734;0.0356
0.3772 0.5614 -0.4688 0.7900 -0.6853 0.1483 -0.8331 0.5086 0.4401;-0.5591 -0.5856 -0.2408 -
0.7193 -0.1949 -0.0434 0.4781 0.5086 -0.1140 0.1603;0.2802 -0.2805 0.6557 -0.4916 0.0300 -
0.4090 0.3734 0.4401 0.1603 -0.6182]

R2=[-0.5177 0.2243 0.6659 0.3319 -0.0619 -0.4156 -0.7896 0.6928 0.7190 0.8971;0.2243
0.2451 -0.3279 0.8674 0.1509 0.2409 0.2709 0.4882 0.2496 -0.4134;0.6659 -0.3279 -0.5983 -
0.2594 -0.2050 0.2470 -0.0604 -0.2339 -0.3981 0.1487;0.3319 0.8674 -0.2594 -0.7850 -0.1628 -
0.6146 0.1366 0.5059 -0.1018 -0.2762;-0.0619 0.1509 -0.2050 -0.1628 0.4719 -0.4420 -0.3948 -
0.2412 0.0192 0.2934;-0.4156 0.2409 0.2470 -0.6146 -0.4420 -0.3102 -0.0225 0.1578 -0.1363
0.1173;-0.7896 0.2709 -0.0604 0.1366 -0.3948 -0.0225 -0.0329 -0.6753 -0.0438 0.1588;0.6928

0.4882 -0.2339 0.5059 -0.2412 0.1578 -0.6753 0.1180 -0.1271 -0.0064;0.7190 0.2496 -0.3981 -
0.1018 0.0192 -0.1363 -0.0438 -0.1271 0.3615 -0.0593;0.8971 -0.4134 0.1487 -0.2762 0.2934
0.1173 0.1588 -0.0064 -0.0593 -0.4277]

Benders Method is applied to the BMI problem

The method lasts 4.4813 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.4552 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.1776 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 3 in this batch has the following matrices (Rs)

R1=[-0.4284 -0.1249 -0.5496 -0.4560 -0.6938 -0.3304 -0.5038 -0.1599 0.6341 -0.1928;-0.1249 -
1.1474 0.0253 -0.6161 -0.0516 0.1044 -0.3137 0.1780 -0.0977 0.6692;-0.5496 0.0253 -0.8985 -
0.6486 -0.4427 -0.3546 -0.0533 -0.7298 -0.3662 0.4934;-0.4560 -0.6161 -0.6486 -0.2295 -

0.5769 0.0019 0.1512 -0.1159 0.1450 0.5353;-0.6938 -0.0516 -0.4427 -0.5769 0.7760 0.4412 -
0.0594 0.1723 -0.5172 -0.0098;-0.3304 0.1044 -0.3546 0.0019 0.4412 -1.0254 -0.3654 -0.6939 -
0.4179 0.3099;-0.5038 -0.3137 -0.0533 0.1512 -0.0594 -0.3654 0.1731 0.5941 0.0741 -0.1302;-
0.1599 0.1780 -0.7298 -0.1159 0.1723 -0.6939 0.5941 0.4700 -0.1366 0.5888;0.6341 -0.0977 -
0.3662 0.1450 -0.5172 -0.4179 0.0741 -0.1366 -0.3423 0.0452;-0.1928 0.6692 0.4934 0.5353 -
0.0098 0.3099 -0.1302 0.5888 0.0452 -0.5678]

R2=[-0.8333 -0.3110 -0.2120 -0.3848 0.2984 -0.1105 0.3986 -0.5418 0.1086 -0.0908;-0.3110 -
0.7823 -0.8622 -0.3613 -0.5613 0.3571 0.7476 -0.0695 0.2372 -0.0073;-0.2120 -0.8622 0.3674
0.0766 -0.2386 0.1665 -0.4914 0.4823 0.7328 -0.2315;-0.3848 -0.3613 0.0766 -0.5071 0.3592 -
0.4669 0.5490 0.4888 0.3942 -0.0400;0.2984 -0.5613 -0.2386 0.3592 0.3534 0.5993 0.5520
0.7470 -0.3087 -0.7394;-0.1105 0.3571 0.1665 -0.4669 0.5993 -0.9061 0.2623 -0.0069 0.6349 -
0.0395;0.3986 0.7476 -0.4914 0.5490 0.5520 0.2623 0.2492 -0.1275 0.0476 0.4486;-0.5418 -
0.0695 0.4823 0.4888 0.7470 -0.0069 -0.1275 -0.7178 0.1453 -0.7028;0.1086 0.2372 0.7328
0.3942 -0.3087 0.6349 0.0476 0.1453 -0.8558 0.8433;-0.0908 -0.0073 -0.2315 -0.0400 -0.7394 -
0.0395 0.4486 -0.7028 0.8433 -0.9690]

Benders Method is applied to the BMI problem

The method lasts 6.1082 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.4950 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.1348 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 4 in this batch has the following matrices (Rs)

R1=[0.5565 -0.1312 -0.2598 0.5106 0.1428 -0.4123 -0.3522 0.7172 -0.4503 0.4795;-0.1312 -0.7505 0.0143 0.0456 -0.5619 -0.0888 0.6555 -0.5584 -0.3080 -0.2028;-0.2598 0.0143 -0.0938 0.2939 -0.1838 -0.2925 -0.3876 -0.2613 -0.7323 0.5015;0.5106 0.0456 0.2939 0.4571 0.3935 0.1932 0.6804 -0.0175 -0.0667 0.3185;0.1428 -0.5619 -0.1838 0.3935 0.3787 0.0606 0.1778 -0.0730 -0.2025 -0.1855;-0.4123 -0.0888 -0.2925 0.1932 0.0606 -0.1848 0.0987 0.3745 -0.0526 0.3362;-0.3522 0.6555 -0.3876 0.6804 0.1778 0.0987 -0.2163 0.1589 0.9283 0.5110;0.7172 -0.5584 -0.2613 -0.0175 -0.0730 0.3745 0.1589 -0.3229 -0.5513 0.0891;-0.4503 -0.3080 -0.7323 -0.0667 -0.2025 -0.0526 0.9283 -0.5513 -1.0236 -0.0389;0.4795 -0.2028 0.5015 0.3185 -0.1855 0.3362 0.5110 0.0891 -0.0389 0.2772]

R2=[-0.9918 -0.1103 0.1474 0.2810 0.0084 -0.1627 -0.3116 0.5844 -0.7257 0.3704;-0.1103 -1.0088 0.8103 -0.5930 0.5772 0.4698 -0.6423 0.3215 -0.6340 0.7042;0.1474 0.8103 -0.4915 0.1003 -0.2120 -0.4591 -0.3799 0.3247 0.2185 0.8227;0.2810 -0.5930 0.1003 0.0061 -0.4001 0.2100 0.3870 0.1914 -0.2784 0.1154;0.0084 0.5772 -0.2120 -0.4001 -0.1412 -0.5070 -0.7158 0.3017 -0.2335 0.2170;-0.1627 0.4698 -0.4591 0.2100 -0.5070 -0.2031 0.4736 -0.1610 -0.4729 -0.0882;-0.3116 -0.6423 -0.3799 0.3870 -0.7158 0.4736 -0.3202 0.3246 -0.0845 0.5282;0.5844 0.3215 0.3247 0.1914 0.3017 -0.1610 0.3246 0.6663 -0.0463 -0.8643;-0.7257 -0.6340 0.2185 -0.2784 -0.2335 -0.4729 -0.0845 -0.0463 -0.4209 0.5938;0.3704 0.7042 0.8227 0.1154 0.2170 -0.0882 0.5282 -0.8643 0.5938 0.0056]

Benders Method is applied to the BMI problem

The method lasts 5.9981 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.5248 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.1269 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 5 in this batch has the following matrices (Rs)

R1=[-0.4664 0.2461 -0.3938 0.5690 0.7597 0.3959 0.2528 0.4299 -0.1631 -0.7113;0.2461
0.4058 -0.1419 -0.3604 -0.6001 0.0641 -0.0296 0.3246 0.2241 -0.4368;-0.3938 -0.1419 0.0352
0.0786 -0.3904 0.2347 -0.0796 0.2079 -0.2475 -0.2204;0.5690 -0.3604 0.0786 -0.5062 0.7989
0.3498 -0.5304 -0.3089 0.1469 -0.0406;0.7597 -0.6001 -0.3904 0.7989 -0.2827 0.1926 0.0906 -
0.0262 -0.4192 0.5781;0.3959 0.0641 0.2347 0.3498 0.1926 0.5324 0.0182 -0.4901 0.2259
0.0480;0.2528 -0.0296 -0.0796 -0.5304 0.0906 0.0182 -0.2868 -0.0714 -0.2048 -0.2040;0.4299
0.3246 0.2079 -0.3089 -0.0262 -0.4901 -0.0714 -0.2946 0.0230 0.0603;-0.1631 0.2241 -0.2475
0.1469 -0.4192 0.2259 -0.2048 0.0230 -1.1470 -0.0597;-0.7113 -0.4368 -0.2204 -0.0406 0.5781
0.0480 -0.2040 0.0603 -0.0597 -0.1475]

R2=[-0.9023 -0.2065 0.9200 -0.5243 0.4270 -0.4576 -0.1650 0.0744 -0.3204 -0.3042;-0.2065
0.1672 0.0451 -0.0024 0.2757 -0.3093 0.2992 -0.1794 -0.0916 -0.1308;0.9200 0.0451 -0.3799
0.2806 0.4200 0.3869 0.3634 -0.6030 -0.4597 -0.7703;-0.5243 -0.0024 0.2806 0.5343 -0.4168
0.6106 0.5664 -0.2976 0.5130 -0.3799;0.4270 0.2757 0.4200 -0.4168 -1.0239 0.5812 -0.1039 -
0.0496 -0.1389 -0.0880;-0.4576 -0.3093 0.3869 0.6106 0.5812 -0.7691 -0.5748 0.2199 -0.5293 -
0.4894;-0.1650 0.2992 0.3634 0.5664 -0.1039 -0.5748 0.5029 -0.3740 0.4322 -0.4790;0.0744 -
0.1794 -0.6030 -0.2976 -0.0496 0.2199 -0.3740 0.4195 0.4536 -0.1640;-0.3204 -0.0916 -0.4597

0.5130 -0.1389 -0.5293 0.4322 0.4536 -0.3223 -0.0288;-0.3042 -0.1308 -0.7703 -0.3799 -0.0880
-0.4894 -0.4790 -0.1640 -0.0288 -0.2178]

Benders Method is applied to the BMI problem

The method lasts 4.5059 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.1080 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.1291 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 6 in this batch has the following matrices (Rs)

R1=[0.0991 0.5414 -0.6305 -0.3131 0.0638 -0.7377 0.7055 -0.1283 0.2800 -0.0642;0.5414
0.1289 0.6662 0.3833 0.4969 -0.3437 -0.0034 0.5751 0.3346 -0.3073;-0.6305 0.6662 -0.9266
0.0582 -0.4191 0.6709 0.2975 -0.2217 0.7343 0.3721;-0.3131 0.3833 0.0582 -0.3859 -0.3068 -
0.1540 0.3619 -0.7349 0.7156 -0.5513;0.0638 0.4969 -0.4191 -0.3068 0.6952 -0.4112 0.3303

0.0523 -0.5096 0.1724;-0.7377 -0.3437 0.6709 -0.1540 -0.4112 -0.9768 -0.3940 0.0191 -0.8090
-0.0152;0.7055 -0.0034 0.2975 0.3619 0.3303 -0.3940 -0.8699 0.0826 -0.3583 -0.1182;-0.1283
0.5751 -0.2217 -0.7349 0.0523 0.0191 0.0826 0.4154 0.0481 -0.2685;0.2800 0.3346 0.7343
0.7156 -0.5096 -0.8090 -0.3583 0.0481 -1.0062 -0.0551;-0.0642 -0.3073 0.3721 -0.5513 0.1724
-0.0152 -0.1182 -0.2685 -0.0551 0.0851]

R2=[0.5274 -0.2021 -0.3758 -0.2645 -0.2962 -0.0110 0.4411 0.4911 0.1352 -0.0666;-0.2021 -
0.3624 -0.1850 -0.7415 0.1356 -0.1125 -0.1326 0.3687 0.1402 0.1282;-0.3758 -0.1850 -0.5525
0.0980 -0.4854 0.1273 -0.0930 -0.6047 0.4611 -0.1955;-0.2645 -0.7415 0.0980 -0.7295 -0.3613
-0.1634 -0.4581 0.1268 -0.5357 -0.6071;-0.2962 0.1356 -0.4854 -0.3613 0.6360 0.1152 0.7953 -
0.0448 -0.2817 0.0527;-0.0110 -0.1125 0.1273 -0.1634 0.1152 0.7610 0.1450 -0.1617 -0.0557 -
0.4818;0.4411 -0.1326 -0.0930 -0.4581 0.7953 0.1450 -0.0441 0.1854 0.5788 0.2907;0.4911
0.3687 -0.6047 0.1268 -0.0448 -0.1617 0.1854 0.6425 -0.4850 0.4538;0.1352 0.1402 0.4611 -
0.5357 -0.2817 -0.0557 0.5788 -0.4850 -1.1770 -0.1876;-0.0666 0.1282 -0.1955 -0.6071 0.0527
-0.4818 0.2907 0.4538 -0.1876 -0.6320]

Benders Method is applied to the BMI problem

The method lasts 2.9308 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.4480 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.1097 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[0.2232 -0.0488 0.5641 0.0114 0.1587 0.7999 -0.8010 0.4648 0.0776 0.1120;-0.0488 -
1.1553 0.0548 -0.3389 0.1379 0.6063 -0.1027 -0.2800 0.0519 0.4134;0.5641 0.0548 -0.9256 -
0.0246 -0.2850 -0.1205 -0.1817 -0.6818 0.3851 -0.3200;0.0114 -0.3389 -0.0246 0.2307 0.2495 -
0.7384 -0.0626 -0.3715 0.4904 -0.5238;0.1587 0.1379 -0.2850 0.2495 -0.9393 0.3027 -0.1611
0.6778 -0.4796 -0.0757;0.7999 0.6063 -0.1205 -0.7384 0.3027 -1.1051 0.4368 -0.5789 -0.0700 -
0.2542;-0.8010 -0.1027 -0.1817 -0.0626 -0.1611 0.4368 -1.1728 0.3325 -0.5884 0.0267;0.4648 -
0.2800 -0.6818 -0.3715 0.6778 -0.5789 0.3325 -0.4974 -0.7190 0.4382;0.0776 0.0519 0.3851
0.4904 -0.4796 -0.0700 -0.5884 -0.7190 -0.2724 -0.3444;0.1120 0.4134 -0.3200 -0.5238 -0.0757
-0.2542 0.0267 0.4382 -0.3444 0.1520]

R2=[-0.9416 0.0985 -0.1928 -0.3848 0.2490 -0.6047 0.4644 -0.6749 0.0859 0.0124;0.0985 -
0.7563 -0.1351 -0.6958 0.3417 0.3375 0.0084 -0.4264 0.4606 -0.8592;-0.1928 -0.1351 0.2010 -
0.2591 0.4402 0.1470 -0.1241 -0.7141 0.8169 0.1911;-0.3848 -0.6958 -0.2591 0.5544 -0.6135
0.2528 0.3163 -0.1736 0.4363 -0.4106;0.2490 0.3417 0.4402 -0.6135 -0.9504 -0.4199 0.0756 -
0.5322 0.7016 0.2014;-0.6047 0.3375 0.1470 0.2528 -0.4199 0.3259 0.3445 0.1121 -0.2455 -
0.6528;0.4644 0.0084 -0.1241 0.3163 0.0756 0.3445 0.0309 -0.0130 0.0704 0.2039;-0.6749 -
0.4264 -0.7141 -0.1736 -0.5322 0.1121 -0.0130 -0.0896 -0.0861 -0.2566;0.0859 0.4606 0.8169
0.4363 0.7016 -0.2455 0.0704 -0.0861 0.1378 0.0212;0.0124 -0.8592 0.1911 -0.4106 0.2014 -
0.6528 0.2039 -0.2566 0.0212 -1.1731]

Benders Method is applied to the BMI problem

The method lasts 4.5408 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.9364 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.1160 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 8 in this batch has the following matrices (Rs)

R1=[-0.6564 -0.0392 0.2688 0.2716 -0.2770 -0.8062 -0.0827 -0.0516 -0.0065 -0.3609;-0.0392
0.6639 0.3237 0.1752 0.1589 -0.3617 -0.2313 -0.1876 -0.2096 -0.3002;0.2688 0.3237 0.6826 -
0.2149 -0.1787 0.0360 -0.4981 0.3705 0.3756 -0.1810;0.2716 0.1752 -0.2149 -0.7038 0.5367 -
0.3132 0.4931 -0.2890 -0.2949 0.2019;-0.2770 0.1589 -0.1787 0.5367 -0.4715 -0.1330 0.0907
0.1767 -0.2889 0.3900;-0.8062 -0.3617 0.0360 -0.3132 -0.1330 -1.0664 -0.3534 0.1364 -0.4801
0.4684;-0.0827 -0.2313 -0.4981 0.4931 0.0907 -0.3534 -0.7004 -0.0368 -0.2081 0.6263;-0.0516
-0.1876 0.3705 -0.2890 0.1767 0.1364 -0.0368 0.2665 0.1063 -0.2282;-0.0065 -0.2096 0.3756 -
0.2949 -0.2889 -0.4801 -0.2081 0.1063 0.2297 0.1595;-0.3609 -0.3002 -0.1810 0.2019 0.3900
0.4684 0.6263 -0.2282 0.1595 -0.7528]

R2=[-0.9360 0.9034 0.0550 0.6424 -0.4772 -0.4899 -0.7323 0.4813 -0.1536 -0.2762;0.9034
0.3035 0.2244 -0.1758 -0.0012 -0.1632 0.8416 -0.8047 -0.6796 0.4882;0.0550 0.2244 0.7371
0.6273 0.5169 -0.2660 -0.0538 0.0474 0.6698 0.2223;0.6424 -0.1758 0.6273 0.3444 0.7998 -
0.1649 0.1088 0.2256 0.2157 -0.2898;-0.4772 -0.0012 0.5169 0.7998 -0.9129 -0.0853 -0.1674 -
0.4585 0.6085 0.2390;-0.4899 -0.1632 -0.2660 -0.1649 -0.0853 0.2741 0.0490 -0.4008 0.0695 -
0.1295;-0.7323 0.8416 -0.0538 0.1088 -0.1674 0.0490 -0.1833 0.0551 -0.3908 0.1809;0.4813 -
0.8047 0.0474 0.2256 -0.4585 -0.4008 0.0551 -0.9920 -0.2094 0.0852;-0.1536 -0.6796 0.6698
0.2157 0.6085 0.0695 -0.3908 -0.2094 -0.9443 0.2959;-0.2762 0.4882 0.2223 -0.2898 0.2390 -
0.1295 0.1809 0.0852 0.2959 -0.8657]

Benders Method is applied to the BMI problem

The method lasts 2.9440 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.4487 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.1147 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 9 in this batch has the following matrices (Rs)

R1=[0.1158 -0.2172 0.3116 0.2227 -0.1446 -0.1931 -0.3330 0.7305 -0.0957 -0.1044;-0.2172
0.2898 -0.0434 0.0419 -0.0511 0.5801 0.2563 -0.3744 0.0826 -0.5322;0.3116 -0.0434 0.5421 -
0.2430 -0.6856 -0.1066 0.2800 0.2378 0.7220 -0.1895;0.2227 0.0419 -0.2430 -0.5786 0.3671 -
0.3546 -0.5476 -0.5590 0.5836 -0.0703;-0.1446 -0.0511 -0.6856 0.3671 -0.3258 -0.5765 -0.3237
-0.5405 0.4163 0.2658;-0.1931 0.5801 -0.1066 -0.3546 -0.5765 -0.7887 -0.5412 -0.3909 -0.0136
0.8921;-0.3330 0.2563 0.2800 -0.5476 -0.3237 -0.5412 0.6595 0.0359 -0.3068 -0.5554;0.7305 -

0.3744 0.2378 -0.5590 -0.5405 -0.3909 0.0359 -0.7374 0.4475 0.6197;-0.0957 0.0826 0.7220
0.5836 0.4163 -0.0136 -0.3068 0.4475 0.0596 0.2334;-0.1044 -0.5322 -0.1895 -0.0703 0.2658
0.8921 -0.5554 0.6197 0.2334 -0.1350]

R2=[-0.5646 -0.2424 -0.6237 0.4670 0.4000 -0.1032 -0.1284 -0.1341 0.1488 0.4450;-0.2424 -
0.5281 -0.0417 0.2619 0.0629 -0.1120 0.3174 -0.0344 0.5661 -0.0205;-0.6237 -0.0417 0.1601 -
0.9679 0.3763 0.3109 0.0112 -0.2329 -0.1250 -0.0913;0.4670 0.2619 -0.9679 -0.2210 0.0621
0.3202 -0.5884 0.5168 -0.1272 -0.1384;0.4000 0.0629 0.3763 0.0621 -1.1308 0.4671 -0.0436
0.2126 0.1374 0.2723;-0.1032 -0.1120 0.3109 0.3202 0.4671 -0.3783 0.5592 0.1586 0.6081
0.1260;-0.1284 0.3174 0.0112 -0.5884 -0.0436 0.5592 0.1827 0.3697 -0.2361 -0.7839;-0.1341 -
0.0344 -0.2329 0.5168 0.2126 0.1586 0.3697 0.6380 -0.1944 0.2189;0.1488 0.5661 -0.1250 -
0.1272 0.1374 0.6081 -0.2361 -0.1944 -0.8789 -0.1495;0.4450 -0.0205 -0.0913 -0.1384 0.2723
0.1260 -0.7839 0.2189 -0.1495 0.0608]

Benders Method is applied to the BMI problem

The method lasts 4.4847 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.9699 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.1964 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[-0.0327 0.6217 0.2623 -0.0422 -0.2651 0.0018 0.5960 -0.7673 0.1060 0.3959;0.6217 -
1.0272 0.7856 0.0236 0.5899 -0.6892 -0.3164 0.1350 -0.1830 -0.2503;0.2623 0.7856 -0.7355
0.4245 0.2902 -0.1140 0.0641 -0.4571 -0.3376 -0.0743;-0.0422 0.0236 0.4245 -1.0633 0.4849
0.5892 0.2424 0.2369 0.8779 -0.3321;-0.2651 0.5899 0.2902 0.4849 -0.3461 -0.2469 0.8511 -
0.1336 -0.0008 0.0344;0.0018 -0.6892 -0.1140 0.5892 -0.2469 0.6786 0.6757 -0.2596 0.3604 -
0.2251;0.5960 -0.3164 0.0641 0.2424 0.8511 0.6757 0.3606 -0.0982 -0.2706 0.2110;-0.7673
0.1350 -0.4571 0.2369 -0.1336 -0.2596 -0.0982 0.0200 -0.8346 -0.6432;0.1060 -0.1830 -0.3376
0.8779 -0.0008 0.3604 -0.2706 -0.8346 -0.5126 0.1570;0.3959 -0.2503 -0.0743 -0.3321 0.0344 -
0.2251 0.2110 -0.6432 0.1570 0.2861]

R2=[-0.4118 -0.2338 -0.8187 0.4935 -0.0855 -0.5755 0.0568 -0.6678 0.0711 -0.0061;-0.2338 -
0.2711 0.4104 -0.0619 -0.2240 0.4294 0.3634 -0.6993 0.4371 -0.0304;-0.8187 0.4104 -0.8632 -
0.2713 -0.4527 -0.4556 -0.1617 0.6190 0.6104 0.0092;0.4935 -0.0619 -0.2713 -0.7827 0.7247 -
0.3335 0.6245 0.7727 0.2717 0.3835;-0.0855 -0.2240 -0.4527 0.7247 -0.0192 -0.3096 0.3627
0.3598 0.7360 0.4217;-0.5755 0.4294 -0.4556 -0.3335 -0.3096 -1.1252 0.8245 0.7336 0.4275
0.2419;0.0568 0.3634 -0.1617 0.6245 0.3627 0.8245 0.1012 0.5988 0.2740 -0.6947;-0.6678 -
0.6993 0.6190 0.7727 0.3598 0.7336 0.5988 -0.5218 0.2406 0.2345;0.0711 0.4371 0.6104
0.2717 0.7360 0.4275 0.2740 0.2406 0.1987 -0.0281;-0.0061 -0.0304 0.0092 0.3835 0.4217
0.2419 -0.6947 0.2345 -0.0281 -0.0331]

Benders Method is applied to the BMI problem

The method lasts 4.4987 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 1.5098 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 1.1592 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

From here, 10 BMIs in the batch related to $n=10$ and $r=3$ are presented

BMI problem number 1 in this batch has the following matrices (Rs)

$R1 = [-0.5477 \ -0.1067 \ -0.4890 \ 0.4890 \ -0.4656 \ -0.2335 \ -0.7267 \ -0.0168 \ 0.0771 \ -0.0993; -0.1067 \ -0.0532 \ 0.1542 \ -0.7507 \ 0.0896 \ -0.4362 \ -0.1506 \ 0.6699 \ 0.3246 \ -0.2392; -0.4890 \ 0.1542 \ 0.5048 \ -0.3973 \ -0.7034 \ -0.2888 \ 0.5565 \ 0.1131 \ -0.1233 \ -0.2577; 0.4890 \ -0.7507 \ -0.3973 \ -1.2826 \ -0.8097 \ 0.4684 \ 0.2802 \ 0.6258 \ -0.0888 \ 0.0086; -0.4656 \ 0.0896 \ -0.7034 \ -0.8097 \ -0.9494 \ -0.0778 \ 0.2200 \ 0.0732 \ 0.2349 \ -0.6916; -0.2335 \ -0.4362 \ -0.2888 \ 0.4684 \ -0.0778 \ 0.4863 \ 0.3147 \ 0.1764 \ -0.6503 \ -0.3232; -0.7267 \ -0.1506 \ 0.5565 \ 0.2802 \ 0.2200 \ 0.3147 \ -0.5262 \ 0.0539 \ -0.4753 \ -0.0049; -0.0168 \ 0.6699 \ 0.1131 \ 0.6258 \ 0.0732 \ 0.1764 \ 0.0539 \ 0.2974 \ 0.5492 \ -0.3027; 0.0771 \ 0.3246 \ -0.1233 \ -0.0888 \ 0.2349 \ -0.6503 \ -0.4753 \ 0.5492 \ -0.4812 \ 0.0872; -0.0993 \ -0.2392 \ -0.2577 \ 0.0086 \ -0.6916 \ -0.3232 \ -0.0049 \ -0.3027 \ 0.0872 \ -0.5867]$

$R2 = [0.4082 \ -0.4448 \ 0.6682 \ 0.1600 \ -0.5021 \ -0.2038 \ -0.1111 \ 0.7331 \ -0.1761 \ 0.9967; -0.4448 \ -0.0138 \ -0.0496 \ 0.5419 \ 0.3793 \ -0.5555 \ -0.2750 \ -0.5377 \ -0.2963 \ 0.6100; 0.6682 \ -0.0496 \ 0.4822 \ -0.4758 \ 0.1576 \ -0.5956 \ -0.1898 \ 0.1424 \ 0.1262 \ -0.2947; 0.1600 \ 0.5419 \ -0.4758 \ -0.2311 \ -0.0846 \ -0.6494 \ 0.6862 \ -0.2491 \ -0.0681 \ -0.9062; -0.5021 \ 0.3793 \ 0.1576 \ -0.0846 \ -0.0520 \ -0.0035 \ 0.3347 \ 0.1482 \ 0.6020 \ 0.2945; -0.2038 \ -0.5555 \ -0.5956 \ -0.6494 \ -0.0035 \ 0.5020 \ -0.5455 \ -0.4086 \ 0.3546 \ -0.1078; -0.1111 \ -0.2750 \ -0.1898 \ 0.6862 \ 0.3347 \ -0.5455 \ 0.1312 \ 0.3029 \ -0.5914 \ 0.3201; 0.7331 \ -0.5377 \ 0.1424 \ -0.2491 \ 0.1482 \ -0.4086 \ 0.3029 \ -0.7826 \ -0.4078 \ -0.8233; -0.1761 \ -0.2963 \ 0.1262 \ -0.0681 \ 0.6020 \ 0.3546 \ -0.5914 \ -0.4078 \ -1.2868 \ 0.0192; 0.9967 \ 0.6100 \ -0.2947 \ -0.9062 \ 0.2945 \ -0.1078 \ 0.3201 \ -0.8233 \ 0.0192 \ -1.0741]$

R3=[-0.8297 -0.2073 0.1311 0.4006 0.2433 -0.0398 -0.4251 -0.4758 -0.8478 -0.2665;-0.2073 0.4083 -0.0028 0.0175 -0.0819 0.1160 -0.6723 0.4331 0.0430 -0.1600;0.1311 -0.0028 0.0659 0.6038 0.2153 -0.3151 -0.5008 0.6130 0.1289 0.5794;0.4006 0.0175 0.6038 0.6986 0.4273 -0.1570 0.2518 0.3560 0.6212 -0.1012;0.2433 -0.0819 0.2153 0.4273 -0.9988 0.2588 0.1560 -0.1060 0.7536 0.8640;-0.0398 0.1160 -0.3151 -0.1570 0.2588 0.0121 -0.3293 -0.6240 0.1555 0.1402;-0.4251 -0.6723 -0.5008 0.2518 0.1560 -0.3293 0.0888 0.6502 -0.1182 -0.7405;-0.4758 0.4331 0.6130 0.3560 -0.1060 -0.6240 0.6502 -1.0768 -0.4559 -0.0117;-0.8478 0.0430 0.1289 0.6212 0.7536 0.1555 -0.1182 -0.4559 -0.7056 0.0424;-0.2665 -0.1600 0.5794 -0.1012 0.8640 0.1402 -0.7405 -0.0117 0.0424 -0.1395]

Benders Method is applied to the BMI problem

The method lasts 21.3578 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 6.1951 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 4.4942 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[-0.2470 0.2243 0.4859 -0.4937 0.6749 0.1026 0.1077 0.4325 0.4567 -0.6082;0.2243 0.2889
0.1362 0.7230 -0.4895 0.1145 -0.7882 -0.1384 -0.0712 -0.6317;0.4859 0.1362 -0.9591 0.0867
0.1960 0.8315 -0.5662 0.2305 0.6583 0.4729;-0.4937 0.7230 0.0867 -0.0601 -0.0937 0.5156 -
0.2962 0.4420 0.7351 0.4637;0.6749 -0.4895 0.1960 -0.0937 0.0995 0.6207 -0.5488 0.3297 -
0.8905 0.5563;0.1026 0.1145 0.8315 0.5156 0.6207 -0.2522 -0.0228 -0.1055 -0.5654
0.6773;0.1077 -0.7882 -0.5662 -0.2962 -0.5488 -0.0228 -0.9939 0.0507 -0.7055 -0.0308;0.4325
-0.1384 0.2305 0.4420 0.3297 -0.1055 0.0507 -1.1148 0.4636 0.4655;0.4567 -0.0712 0.6583
0.7351 -0.8905 -0.5654 -0.7055 0.4636 0.4019 0.0403;-0.6082 -0.6317 0.4729 0.4637 0.5563
0.6773 -0.0308 0.4655 0.0403 -0.5937]

R2=[0.2838 0.4554 -0.1595 0.1887 -0.2701 0.3687 0.6539 0.2222 -0.1205 0.0488;0.4554 -
0.3467 -0.1494 -0.1989 -0.1704 -0.5396 0.1330 0.1362 -0.0393 0.5525;-0.1595 -0.1494 0.3941 -
0.3177 -0.1143 -0.5728 0.0275 -0.1456 0.3044 0.1477;0.1887 -0.1989 -0.3177 0.3627 -0.1415
0.1348 0.0826 0.4574 0.1485 0.5258;-0.2701 -0.1704 -0.1143 -0.1415 -0.9347 -0.0211 -0.0046
0.2575 0.1678 0.4004;0.3687 -0.5396 -0.5728 0.1348 -0.0211 -1.0778 0.2163 -0.3751 0.2225 -
0.5298;0.6539 0.1330 0.0275 0.0826 -0.0046 0.2163 -1.2425 -0.0850 0.2681 -0.0430;0.2222
0.1362 -0.1456 0.4574 0.2575 -0.3751 -0.0850 0.1495 0.1038 -0.4974;-0.1205 -0.0393 0.3044
0.1485 0.1678 0.2225 0.2681 0.1038 -0.2457 0.2573;0.0488 0.5525 0.1477 0.5258 0.4004 -
0.5298 -0.0430 -0.4974 0.2573 -0.6982]

R3=[0.4284 -0.2977 0.1679 0.8422 -0.2808 0.4305 -0.0664 0.6302 -0.6506 0.2745;-0.2977 -
0.9331 0.3787 -0.5265 -0.1295 -0.5458 -0.2587 -0.2425 -0.3924 -0.6667;0.1679 0.3787 -1.0746
-0.2047 -0.7164 -0.0391 0.2476 -0.7872 0.6481 0.0591;0.8422 -0.5265 -0.2047 0.5920 -0.0009 -
0.3423 -0.4309 -0.0154 0.0933 -0.3675;-0.2808 -0.1295 -0.7164 -0.0009 -0.9039 0.6582 -0.0938
-0.6138 -0.0076 -0.1308;0.4305 -0.5458 -0.0391 -0.3423 0.6582 -1.0737 0.1477 0.6226 -0.4787
-0.0097;-0.0664 -0.2587 0.2476 -0.4309 -0.0938 0.1477 -0.9511 0.1233 0.5213 -0.4172;0.6302 -
0.2425 -0.7872 -0.0154 -0.6138 0.6226 0.1233 -1.2590 -0.3102 -0.7569;-0.6506 -0.3924 0.6481
0.0933 -0.0076 -0.4787 0.5213 -0.3102 -0.9943 0.0006;0.2745 -0.6667 0.0591 -0.3675 -0.1308 -
0.0097 -0.4172 -0.7569 0.0006 -1.1423]

Benders Method is applied to the BMI problem

The method lasts 11.7257 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.8919 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.4119 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 3 in this batch has the following matrices (Rs)

R1=[0.5260 0.0900 -0.2399 0.2629 0.1978 -0.1356 -0.1907 -0.4839 0.0476 0.4304;0.0900 -0.0651 -0.4377 -0.2232 0.3628 0.2601 -0.3042 -0.8027 0.2688 -0.5515;-0.2399 -0.4377 0.1390 -0.4347 0.0368 -0.4854 0.7945 0.3062 0.1184 0.6626;0.2629 -0.2232 -0.4347 0.0692 -0.5912 -0.1882 0.2346 -0.7934 -0.2220 0.5940;0.1978 0.3628 0.0368 -0.5912 -0.2170 0.4202 0.0223 -0.0204 0.5185 0.5482;-0.1356 0.2601 -0.4854 -0.1882 0.4202 0.6316 0.5598 -0.0930 0.1598 -0.2587;-0.1907 -0.3042 0.7945 0.2346 0.0223 0.5598 0.0772 -0.5460 -0.0326 -0.0194;-0.4839 -0.8027 0.3062 -0.7934 -0.0204 -0.0930 -0.5460 0.0943 0.5918 -0.3511;0.0476 0.2688 0.1184 -0.2220 0.5185 0.1598 -0.0326 0.5918 -1.0646 -0.7080;0.4304 -0.5515 0.6626 0.5940 0.5482 -0.2587 -0.0194 -0.3511 -0.7080 -0.4223]

R2=[-0.0446 -0.5616 0.1547 0.1425 0.0056 0.2082 -0.4700 0.2619 -0.7140 -0.4994;-0.5616 -1.0763 0.2237 0.0365 0.3354 0.2029 0.1594 -0.3481 -0.1886 0.1533;0.1547 0.2237 -0.8449 -0.4579 0.3044 -0.5068 -0.2634 0.1365 -0.0605 -0.0295;0.1425 0.0365 -0.4579 0.5992 -0.1310 -0.7696 -0.0165 -0.0378 0.4890 0.1053;0.0056 0.3354 0.3044 -0.1310 0.2341 0.0320 0.6751 0.1649 -0.3042 -0.5307;0.2082 0.2029 -0.5068 -0.7696 0.0320 -0.0841 0.0936 -0.4451 -0.3023

0.2757;-0.4700 0.1594 -0.2634 -0.0165 0.6751 0.0936 0.2500 0.3127 0.6299 -0.0846;0.2619 -
0.3481 0.1365 -0.0378 0.1649 -0.4451 0.3127 -0.9714 -0.3508 -0.3273;-0.7140 -0.1886 -0.0605
0.4890 -0.3042 -0.3023 0.6299 -0.3508 0.3938 -0.3893;-0.4994 0.1533 -0.0295 0.1053 -0.5307
0.2757 -0.0846 -0.3273 -0.3893 -0.7597]

R3=[-0.4836 0.8151 -0.4108 -0.4479 0.4522 -0.2937 -0.3085 0.0554 0.2630 -0.7987;0.8151 -
0.5968 -0.4019 0.1685 0.0404 -0.5600 0.1793 -0.0216 -0.2148 0.2976;-0.4108 -0.4019 -0.2007
0.3366 -0.4546 -0.1173 0.3239 -0.6423 0.2428 -0.0472;-0.4479 0.1685 0.3366 -0.5928 -0.6762 -
0.1467 -0.4711 -0.5925 -0.0904 0.3978;0.4522 0.0404 -0.4546 -0.6762 -0.2691 -0.7609 0.5725
0.1837 0.2882 0.3577;-0.2937 -0.5600 -0.1173 -0.1467 -0.7609 0.1578 -0.5868 -0.5359 -0.0382
0.3389;-0.3085 0.1793 0.3239 -0.4711 0.5725 -0.5868 -0.5046 -0.3113 0.3332 0.7245;0.0554 -
0.0216 -0.6423 -0.5925 0.1837 -0.5359 -0.3113 -0.4233 0.0524 0.0620;0.2630 -0.2148 0.2428 -
0.0904 0.2882 -0.0382 0.3332 0.0524 -1.2484 0.0612;-0.7987 0.2976 -0.0472 0.3978 0.3577
0.3389 0.7245 0.0620 0.0612 -0.1639]

Benders Method is applied to the BMI problem

The method lasts 31.5039 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 6.2339 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 4.4258 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 4 in this batch has the following matrices (Rs)

R1=[-0.0523 -0.2025 -0.5551 -0.1946 -0.4058 -0.1201 -0.5014 0.7284 0.0267 0.6249;-0.2025 -
0.9361 0.0636 -0.1402 0.3186 0.5598 0.4580 0.6092 0.4160 0.2308;-0.5551 0.0636 0.6178
0.0845 0.2920 -0.6582 -0.6144 0.2171 -0.2873 0.5414;-0.1946 -0.1402 0.0845 -0.4724 -0.1887
0.7000 -0.3549 -0.2670 0.0140 -0.1994;-0.4058 0.3186 0.2920 -0.1887 -0.2787 0.1064 0.1172
0.3807 -0.2970 0.1318;-0.1201 0.5598 -0.6582 0.7000 0.1064 0.5729 0.2587 -0.5648 -0.1129 -
0.2655;-0.5014 0.4580 -0.6144 -0.3549 0.1172 0.2587 -0.8151 -0.2927 0.0765 0.1731;0.7284
0.6092 0.2171 -0.2670 0.3807 -0.5648 -0.2927 -1.2570 -0.1930 0.1350;0.0267 0.4160 -0.2873
0.0140 -0.2970 -0.1129 0.0765 -0.1930 -0.2284 -0.1868;0.6249 0.2308 0.5414 -0.1994 0.1318 -
0.2655 0.1731 0.1350 -0.1868 -0.5267]

R2=[0.1092 0.7327 0.0958 -0.1415 0.2657 -0.0481 -0.3890 -0.1270 0.0359 0.4387;0.7327
0.6457 0.4440 0.0625 0.2440 -0.2113 0.0228 -0.3064 -0.0190 -0.2255;0.0958 0.4440 0.6455
0.0596 -0.4286 -0.1534 0.5330 0.2156 0.3511 -0.6483;-0.1415 0.0625 0.0596 -0.2063 -0.2349 -
0.8911 -0.0610 0.1474 -0.2555 0.7937;0.2657 0.2440 -0.4286 -0.2349 0.5026 0.4205 -0.2715
0.2002 -0.0877 -0.2337;-0.0481 -0.2113 -0.1534 -0.8911 0.4205 -0.9323 0.1499 -0.2333 -0.0085
0.7954;-0.3890 0.0228 0.5330 -0.0610 -0.2715 0.1499 -0.8808 0.1228 -0.1842 0.0674;-0.1270 -
0.3064 0.2156 0.1474 0.2002 -0.2333 0.1228 0.1549 -0.1065 -0.5551;0.0359 -0.0190 0.3511 -
0.2555 -0.0877 -0.0085 -0.1842 -0.1065 0.3697 0.2092;0.4387 -0.2255 -0.6483 0.7937 -0.2337
0.7954 0.0674 -0.5551 0.2092 -0.6283]

R3=[0.1139 -0.0963 0.5755 0.7024 -0.1863 -0.1493 0.2452 -0.2337 0.2914 -0.9000;-0.0963
0.0822 -0.0459 0.5376 -0.5544 0.7293 -0.0614 -0.5199 -0.4534 0.1318;0.5755 -0.0459 0.2997 -
0.1837 0.2574 -0.1022 -0.0573 0.1643 -0.4114 0.1365;0.7024 0.5376 -0.1837 -1.1644 0.8149
0.4160 -0.1871 -0.4635 -0.0683 -0.2718;-0.1863 -0.5544 0.2574 0.8149 -0.7548 -0.7653 0.4872
-0.3458 0.0667 0.6801;-0.1493 0.7293 -0.1022 0.4160 -0.7653 -0.9534 -0.1671 -0.6927 -0.2970
0.8150;0.2452 -0.0614 -0.0573 -0.1871 0.4872 -0.1671 -0.6048 -0.4924 -0.7647 0.6137;-0.2337
-0.5199 0.1643 -0.4635 -0.3458 -0.6927 -0.4924 -0.6410 -0.3300 -0.5471;0.2914 -0.4534 -
0.4114 -0.0683 0.0667 -0.2970 -0.7647 -0.3300 0.5618 0.0410;-0.9000 0.1318 0.1365 -0.2718
0.6801 0.8150 0.6137 -0.5471 0.0410 -1.0142]

Benders Method is applied to the BMI problem

The method lasts 11.7908 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.6992 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.3405 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 5 in this batch has the following matrices (Rs)

R1=[-1.0677 -0.4569 0.1774 0.4324 0.1135 0.3765 0.7719 0.1971 -0.5246 -0.1511;-0.4569 -
0.1209 0.4854 -0.2448 0.2333 -0.4468 -0.8694 -0.2865 -0.4002 0.6294;0.1774 0.4854 -0.0113 -
0.0755 -0.1195 -0.2553 0.4043 0.1051 -0.4382 -0.6113;0.4324 -0.2448 -0.0755 -0.4021 0.2114 -
0.8989 -0.1076 -0.5390 -0.0194 0.0064;0.1135 0.2333 -0.1195 0.2114 -0.7107 -0.4163 0.3366 -
0.3752 0.4863 -0.2470;0.3765 -0.4468 -0.2553 -0.8989 -0.4163 -0.1850 -0.3720 0.0945 0.0614
0.2505;0.7719 -0.8694 0.4043 -0.1076 0.3366 -0.3720 0.2153 -0.0362 0.3448 -0.1623;0.1971 -
0.2865 0.1051 -0.5390 -0.3752 0.0945 -0.0362 0.0002 -0.3309 0.0276;-0.5246 -0.4002 -0.4382 -
0.0194 0.4863 0.0614 0.3448 -0.3309 0.6089 0.1218;-0.1511 0.6294 -0.6113 0.0064 -0.2470
0.2505 -0.1623 0.0276 0.1218 0.5134]

R2=[-1.2427 0.0466 0.0179 0.1050 -0.6098 0.4393 0.0140 -0.3935 -0.3636 0.1739;0.0466 -
0.0036 -0.2923 0.2233 0.4874 0.2081 -0.2007 -0.0623 -0.2059 -0.1819;0.0179 -0.2923 -0.4779 -
0.4875 0.2328 -0.4689 -0.3131 0.3823 -0.3414 0.3736;0.1050 0.2233 -0.4875 -0.0416 0.2528
0.3390 0.1491 -0.5663 -0.3061 -0.0464;-0.6098 0.4874 0.2328 0.2528 -0.5232 0.3898 -0.4602 -
0.4621 0.3917 0.6004;0.4393 0.2081 -0.4689 0.3390 0.3898 -0.3154 0.4068 0.5157 -0.5679
0.1107;0.0140 -0.2007 -0.3131 0.1491 -0.4602 0.4068 -0.9622 0.0684 -0.0094 -0.3523;-0.3935 -
0.0623 0.3823 -0.5663 -0.4621 0.5157 0.0684 -1.1445 -0.5476 -0.0879;-0.3636 -0.2059 -0.3414
-0.3061 0.3917 -0.5679 -0.0094 -0.5476 0.6089 -0.3041;0.1739 -0.1819 0.3736 -0.0464 0.6004
0.1107 -0.3523 -0.0879 -0.3041 -0.3555]

R3=[-1.2785 -0.7788 -0.5545 -0.0331 -0.3271 -0.1121 0.2812 -0.8616 -0.4481 0.4305;-0.7788 -
0.0707 0.1779 0.1869 -0.1633 -0.4017 -0.7571 -0.3079 0.2563 0.8763;-0.5545 0.1779 0.0637 -
0.3030 -0.3618 -0.2238 -0.1120 0.0312 -0.4502 -0.1917;-0.0331 0.1869 -0.3030 -0.7403 -0.6173
-0.1683 -0.1866 -0.3293 -0.0352 -0.2993;-0.3271 -0.1633 -0.3618 -0.6173 -0.3420 0.0205 -
0.0763 -0.7296 -0.0500 -0.6653;-0.1121 -0.4017 -0.2238 -0.1683 0.0205 -0.6383 -0.4583 -
0.2035 0.1047 -0.1605;0.2812 -0.7571 -0.1120 -0.1866 -0.0763 -0.4583 0.4594 0.3621 -0.1015 -
0.1577;-0.8616 -0.3079 0.0312 -0.3293 -0.7296 -0.2035 0.3621 -0.4364 -0.3567 -0.4924;-0.4481
0.2563 -0.4502 -0.0352 -0.0500 0.1047 -0.1015 -0.3567 -1.0676 -0.5553;0.4305 0.8763 -0.1917
-0.2993 -0.6653 -0.1605 -0.1577 -0.4924 -0.5553 -0.4763]

Benders Method is applied to the BMI problem

The method lasts 11.5866 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.6214 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.2725 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 6 in this batch has the following matrices (Rs)

R1=[0.6011 -0.6926 -0.7575 -0.1961 0.4383 0.3350 0.2943 -0.3800 0.5711 0.1459;-0.6926 -
0.8395 -0.1382 -0.5488 0.4396 -0.1406 -0.7674 0.4442 -0.0487 -0.1898;-0.7575 -0.1382 -0.1972
0.3801 0.2644 -0.6516 0.0069 -0.1089 -0.2417 -0.1207;-0.1961 -0.5488 0.3801 0.3764 -0.1028 -
0.0379 -0.3341 0.4964 0.3970 0.1803;0.4383 0.4396 0.2644 -0.1028 -0.8584 0.0060 0.0569 -
0.2271 0.0309 0.1549;0.3350 -0.1406 -0.6516 -0.0379 0.0060 -0.5586 0.6448 0.1781 0.2520 -
0.8232;0.2943 -0.7674 0.0069 -0.3341 0.0569 0.6448 -0.6217 0.8249 -0.3828 0.3477;-0.3800
0.4442 -0.1089 0.4964 -0.2271 0.1781 0.8249 -0.4613 0.8269 -0.2999;0.5711 -0.0487 -0.2417
0.3970 0.0309 0.2520 -0.3828 0.8269 0.2588 0.4938;0.1459 -0.1898 -0.1207 0.1803 0.1549 -
0.8232 0.3477 -0.2999 0.4938 -0.7532]

R2=[-1.1892 -0.1709 0.4151 0.8083 0.6782 0.1336 0.0332 -0.3739 0.2271 -0.1405;-0.1709
0.2410 0.0758 0.2261 0.0504 0.4185 0.0374 -0.3148 0.1159 -0.1183;0.4151 0.0758 0.6560
0.4168 0.3056 0.1407 -0.2573 0.0159 -0.3603 0.2757;0.8083 0.2261 0.4168 -0.1993 -0.0289
0.8702 -0.2828 0.5267 0.1167 0.3062;0.6782 0.0504 0.3056 -0.0289 -0.3463 -0.6404 0.2298 -
0.7672 0.2302 -0.1242;0.1336 0.4185 0.1407 0.8702 -0.6404 -1.1440 -0.3691 -0.1201 -0.3473 -
0.1139;0.0332 0.0374 -0.2573 -0.2828 0.2298 -0.3691 -0.8056 0.3715 0.0983 0.0219;-0.3739 -
0.3148 0.0159 0.5267 -0.7672 -0.1201 0.3715 0.4118 0.1391 0.0637;0.2271 0.1159 -0.3603
0.1167 0.2302 -0.3473 0.0983 0.1391 0.2117 0.2107;-0.1405 -0.1183 0.2757 0.3062 -0.1242 -
0.1139 0.0219 0.0637 0.2107 0.1216]

R3=[-1.2305 -0.0128 0.0010 -0.0031 0.4383 0.1954 0.0099 -0.2513 -0.5371 0.4718;-0.0128 -
0.8121 0.5446 -0.4987 0.1141 0.5071 -0.0079 0.0983 -0.4726 -0.1003;0.0010 0.5446 -0.6293 -
0.0807 0.2939 0.2711 0.2466 0.6216 -0.0350 -0.4545;-0.0031 -0.4987 -0.0807 -0.0877 -0.2842
0.0055 0.8450 0.8426 0.0285 -0.2852;0.4383 0.1141 0.2939 -0.2842 -0.2258 -0.3290 0.1483 -
0.5273 -0.6420 -0.1746;0.1954 0.5071 0.2711 0.0055 -0.3290 0.6772 0.1198 0.7879 -0.2994 -
0.1941;0.0099 -0.0079 0.2466 0.8450 0.1483 0.1198 -0.5007 0.2495 -0.6866 0.5924;-0.2513
0.0983 0.6216 0.8426 -0.5273 0.7879 0.2495 -0.3392 0.1567 0.0912;-0.5371 -0.4726 -0.0350

0.0285 -0.6420 -0.2994 -0.6866 0.1567 0.0260 0.2073;0.4718 -0.1003 -0.4545 -0.2852 -0.1746 -
0.1941 0.5924 0.0912 0.2073 0.1825]

Benders Method is applied to the BMI problem

The method lasts 9.7513 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 4.1344 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 5.7415 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[0.0740 -0.2189 0.1428 -0.2378 -0.4815 0.4672 -0.3655 0.2945 0.0810 0.0760;-0.2189 -
1.2675 -0.2051 -0.0133 0.0513 -0.1249 -0.0170 0.2491 -0.4509 -0.5898;0.1428 -0.2051 -0.9389
-0.0203 0.2369 0.6848 -0.2414 0.2100 0.0909 -0.6157;-0.2378 -0.0133 -0.0203 -0.6608 -0.4441
0.1740 0.5219 -0.9274 -0.5460 -0.1899;-0.4815 0.0513 0.2369 -0.4441 0.1984 0.5223 -0.3724

0.2142 -0.3792 0.6569;0.4672 -0.1249 0.6848 0.1740 0.5223 -1.2548 0.6667 -0.0159 -0.1160 -
0.3907;-0.3655 -0.0170 -0.2414 0.5219 -0.3724 0.6667 0.1844 0.3281 0.1655 0.3939;0.2945
0.2491 0.2100 -0.9274 0.2142 -0.0159 0.3281 0.6400 -0.0280 0.6702;0.0810 -0.4509 0.0909 -
0.5460 -0.3792 -0.1160 0.1655 -0.0280 -0.7624 -0.6177;0.0760 -0.5898 -0.6157 -0.1899 0.6569
-0.3907 0.3939 0.6702 -0.6177 0.1702]

R2=[0.5461 0.0177 -0.4659 0.3268 0.3513 0.2798 -0.0780 -0.3078 0.0185 -0.0926;0.0177
0.6900 -0.3509 0.3312 -0.0168 -0.1844 -0.9475 -0.5881 -0.4810 -0.4399;-0.4659 -0.3509 0.0820
0.5725 -0.2418 0.6206 0.0029 0.5299 0.1141 0.2235;0.3268 0.3312 0.5725 -0.3339 0.3160 -
0.0181 0.8106 -0.2593 -0.2651 -0.3646;0.3513 -0.0168 -0.2418 0.3160 -0.0321 -0.3882 -0.0600
-0.3968 -0.6063 -0.0174;0.2798 -0.1844 0.6206 -0.0181 -0.3882 -0.0063 0.0449 -0.0271 0.1676
-0.4143;-0.0780 -0.9475 0.0029 0.8106 -0.0600 0.0449 -0.2121 -0.0042 0.5359 -0.7905;-0.3078
-0.5881 0.5299 -0.2593 -0.3968 -0.0271 -0.0042 -0.3202 -0.4150 -0.1884;0.0185 -0.4810 0.1141
-0.2651 -0.6063 0.1676 0.5359 -0.4150 -0.7834 0.4066;-0.0926 -0.4399 0.2235 -0.3646 -0.0174
-0.4143 -0.7905 -0.1884 0.4066 0.0149]

R3=[-0.3573 -0.2732 0.0326 0.3964 0.8221 0.0779 -0.0314 0.5448 0.3979 0.8446;-0.2732
0.5092 0.2905 -0.4857 0.4111 -0.2421 -0.3799 -0.7991 -0.0139 -0.1219;0.0326 0.2905 0.4294 -
0.3274 0.3703 0.4465 0.5970 -0.1608 -0.0194 0.0795;0.3964 -0.4857 -0.3274 0.5192 0.4564
0.0948 0.1907 -0.1356 -0.4593 0.2026;0.8221 0.4111 0.3703 0.4564 -0.9719 -0.5856 0.3606 -
0.4197 -0.0591 0.6662;0.0779 -0.2421 0.4465 0.0948 -0.5856 -0.8254 0.5065 0.0472 0.4139 -
0.5466;-0.0314 -0.3799 0.5970 0.1907 0.3606 0.5065 -0.2866 0.1304 0.5225 -0.0602;0.5448 -
0.7991 -0.1608 -0.1356 -0.4197 0.0472 0.1304 -0.1556 0.2221 -0.5361;0.3979 -0.0139 -0.0194 -
0.4593 -0.0591 0.4139 0.5225 0.2221 0.0555 -0.4031;0.8446 -0.1219 0.0795 0.2026 0.6662 -
0.5466 -0.0602 -0.5361 -0.4031 -0.3606]

Benders Method is applied to the BMI problem

The method lasts 14.2591 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.7745 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.4287 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 8 in this batch has the following matrices (Rs)

R1=[0.1770 -0.5742 0.4775 0.1518 -0.4178 0.4645 -0.3907 -0.3593 -0.2526 0.0163;-0.5742 -
0.6282 -0.6305 0.2102 0.6070 0.7523 0.0740 -0.3102 0.5830 -0.2610;0.4775 -0.6305 -0.0686 -
0.5280 -0.0882 -0.3017 0.4339 -0.0049 -0.6016 0.3593;0.1518 0.2102 -0.5280 -0.2375 0.2654 -
0.5278 0.3590 -0.4648 -0.0356 -0.4074;-0.4178 0.6070 -0.0882 0.2654 0.6644 -0.3667 0.1962
0.6595 -0.1841 0.2953;0.4645 0.7523 -0.3017 -0.5278 -0.3667 0.0291 -0.6381 0.5590 -0.4745
0.7907;-0.3907 0.0740 0.4339 0.3590 0.1962 -0.6381 0.1971 0.3551 -0.2539 -0.0873;-0.3593 -
0.3102 -0.0049 -0.4648 0.6595 0.5590 0.3551 0.5531 -0.0950 -0.3148;-0.2526 0.5830 -0.6016 -
0.0356 -0.1841 -0.4745 -0.2539 -0.0950 -0.6335 0.3105;0.0163 -0.2610 0.3593 -0.4074 0.2953
0.7907 -0.0873 -0.3148 0.3105 -0.4137]

R2=[-1.0810 0.0591 0.1698 0.4110 -0.1052 0.1253 0.9252 -0.0200 0.2479 0.5434;0.0591 -
0.4255 -0.8283 -0.0364 0.1390 0.1657 0.0395 0.0651 0.2147 -0.9203;0.1698 -0.8283 -1.2853
0.2694 -0.2184 -0.0381 0.1239 -0.5923 0.8691 0.0260;0.4110 -0.0364 0.2694 -1.0324 0.2620
0.9685 0.3778 -0.3112 -0.8485 -0.5907;-0.1052 0.1390 -0.2184 0.2620 -0.4950 -0.1083 -0.7123
-0.2636 -0.3769 0.2201;0.1253 0.1657 -0.0381 0.9685 -0.1083 -0.0322 0.5055 -0.1119 -0.1744
0.3424;0.9252 0.0395 0.1239 0.3778 -0.7123 0.5055 0.2663 -0.0451 0.2721 -0.0303;-0.0200
0.0651 -0.5923 -0.3112 -0.2636 -0.1119 -0.0451 -1.1011 0.1146 -0.0953;0.2479 0.2147 0.8691 -
0.8485 -0.3769 -0.1744 0.2721 0.1146 -0.1276 -0.2535;0.5434 -0.9203 0.0260 -0.5907 0.2201
0.3424 -0.0303 -0.0953 -0.2535 -0.6480]

R3=[-0.7858 0.6419 -0.1581 0.2068 0.0282 -0.1024 -0.1304 -0.0033 0.2439 -0.4629;0.6419 -
0.2260 -0.5141 0.8008 -0.0819 0.2572 0.3745 0.3129 0.1268 -0.2488;-0.1581 -0.5141 -0.7923 -
0.4986 -0.1955 0.5065 -0.3630 0.5674 -0.0083 -0.1312;0.2068 0.8008 -0.4986 -0.9829 0.5848 -

0.0424 0.3611 -0.4464 -0.2035 0.0279;0.0282 -0.0819 -0.1955 0.5848 0.5228 0.3826 -0.7607
0.4807 -0.2327 0.1448;-0.1024 0.2572 0.5065 -0.0424 0.3826 -0.3574 -0.7181 0.9426 0.1878 -
0.0932;-0.1304 0.3745 -0.3630 0.3611 -0.7607 -0.7181 -0.5726 0.4245 0.7086 -0.6809;-0.0033
0.3129 0.5674 -0.4464 0.4807 0.9426 0.4245 -0.2173 0.1700 -0.1080;0.2439 0.1268 -0.0083 -
0.2035 -0.2327 0.1878 0.7086 0.1700 -0.8573 0.2009;-0.4629 -0.2488 -0.1312 0.0279 0.1448 -
0.0932 -0.6809 -0.1080 0.2009 0.3527]

Benders Method is applied to the BMI problem

The method lasts 10.6953 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.7116 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.3979 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 9 in this batch has the following matrices (Rs)

R1=[-0.6176 -0.1669 0.0952 0.6168 -0.4474 0.4691 -0.4007 0.4287 -0.0950 -0.5051;-0.1669 -1.0207 -0.3226 -0.1998 -0.0082 -0.4427 -0.1910 0.6223 0.6755 -0.0107;0.0952 -0.3226 0.0523 0.3006 0.3218 -0.4398 -0.5650 0.5620 -0.4115 0.3099;0.6168 -0.1998 0.3006 0.2153 -0.4549 0.3568 0.0851 -0.7377 -0.2664 0.2733;-0.4474 -0.0082 0.3218 -0.4549 -0.3016 -0.5838 -0.3938 0.1095 -0.6713 0.4219;0.4691 -0.4427 -0.4398 0.3568 -0.5838 -1.2534 0.6195 0.1308 0.7266 0.3192;-0.4007 -0.1910 -0.5650 0.0851 -0.3938 0.6195 0.1220 0.0831 -0.2669 -0.0771;0.4287 0.6223 0.5620 -0.7377 0.1095 0.1308 0.0831 -0.2162 0.3607 -0.7739;-0.0950 0.6755 -0.4115 -0.2664 -0.6713 0.7266 -0.2669 0.3607 0.5999 -0.4461;-0.5051 -0.0107 0.3099 0.2733 0.4219 0.3192 -0.0771 -0.7739 -0.4461 -0.8536]

R2=[0.4274 -0.3062 0.1871 0.0498 -0.3335 0.3403 -0.5584 -0.4047 0.6062 0.1633;-0.3062 -0.9398 0.4325 0.0443 -0.5298 -0.5258 0.5457 0.6629 0.3843 -0.4507;0.1871 0.4325 -0.1864 0.0811 -0.0244 0.3772 -0.2189 0.1394 -0.3300 0.7613;0.0498 0.0443 0.0811 -0.1294 0.2831 -0.5829 0.2921 -0.6432 0.7389 -0.2951;-0.3335 -0.5298 -0.0244 0.2831 -0.7100 0.4391 0.7584 -0.5972 0.5167 0.2087;0.3403 -0.5258 0.3772 -0.5829 0.4391 0.1246 0.1569 -0.2102 -0.5732 -0.4969;-0.5584 0.5457 -0.2189 0.2921 0.7584 0.1569 -0.9779 -0.1756 -0.4334 0.5699;-0.4047 0.6629 0.1394 -0.6432 -0.5972 -0.2102 -0.1756 -0.2430 0.2779 0.4061;0.6062 0.3843 -0.3300 0.7389 0.5167 -0.5732 -0.4334 0.2779 -0.7541 0.7109;0.1633 -0.4507 0.7613 -0.2951 0.2087 -0.4969 0.5699 0.4061 0.7109 0.1127]

R3=[0.1501 0.2576 -0.0278 -0.1646 -0.0918 0.4499 -0.2677 0.4393 -0.0403 0.4623;0.2576 0.6419 -0.2958 -0.2162 -0.1517 0.3562 -0.5551 0.7078 0.3754 -0.5809;-0.0278 -0.2958 0.0538 -0.0703 0.3550 -0.1396 -0.2989 0.6275 0.3178 0.2739;-0.1646 -0.2162 -0.0703 -1.1507 -0.4545 -0.0216 0.3815 0.1229 -0.1797 0.2140;-0.0918 -0.1517 0.3550 -0.4545 -0.4958 -0.4557 -0.0416 0.3983 0.2037 0.5622;0.4499 0.3562 -0.1396 -0.0216 -0.4557 -0.0552 -0.4043 0.0992 -0.3476 -0.4525;-0.2677 -0.5551 -0.2989 0.3815 -0.0416 -0.4043 0.6287 0.1689 -0.4582 -0.4901;0.4393 0.7078 0.6275 0.1229 0.3983 0.0992 0.1689 -0.8897 -0.3824 -0.3036;-0.0403 0.3754 0.3178 -0.1797 0.2037 -0.3476 -0.4582 -0.3824 0.2243 0.1762;0.4623 -0.5809 0.2739 0.2140 0.5622 -0.4525 -0.4901 -0.3036 0.1762 -1.1919]

Benders Method is applied to the BMI problem

The method lasts 14.1723 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 6.9002 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 4.5069 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[-0.3706 -0.0203 -0.7299 -0.1745 -0.1406 0.2627 0.1701 0.6452 -0.1894 0.0771;-0.0203
0.3524 -0.1352 0.1353 0.0382 0.0789 -0.6871 -0.0429 0.0215 0.1400;-0.7299 -0.1352 -0.1220 -
0.6412 0.5117 -0.0177 -0.6663 -0.0561 0.5968 -0.8304;-0.1745 0.1353 -0.6412 0.6608 0.1799
0.5017 0.7487 0.0080 -0.1879 0.4535;-0.1406 0.0382 0.5117 0.1799 -1.0659 -0.4434 -0.3712 -
0.0893 -0.1732 0.1333;0.2627 0.0789 -0.0177 0.5017 -0.4434 -0.8780 0.2180 0.2375 -0.1508
0.1649;0.1701 -0.6871 -0.6663 0.7487 -0.3712 0.2180 -0.7187 -0.6754 0.5879 -0.2693;0.6452 -
0.0429 -0.0561 0.0080 -0.0893 0.2375 -0.6754 -0.4126 -0.0397 0.1095;-0.1894 0.0215 0.5968 -
0.1879 -0.1732 -0.1508 0.5879 -0.0397 0.1353 -0.0271;0.0771 0.1400 -0.8304 0.4535 0.1333
0.1649 -0.2693 0.1095 -0.0271 -0.8612]

R2=[-0.3756 -0.2749 -0.0396 0.7819 0.5185 -0.1241 0.5256 -0.4072 -0.8627 0.0965;-0.2749
0.2595 -0.0146 0.0913 -0.3187 -0.5036 -0.0276 0.3416 -0.3708 -0.4991;-0.0396 -0.0146 -0.4474
0.6836 -0.4633 -0.1204 -0.2220 0.1281 0.5415 0.4706;0.7819 0.0913 0.6836 -1.2413 0.7013
0.4299 0.1838 -0.1282 0.4196 -0.6375;0.5185 -0.3187 -0.4633 0.7013 -0.4886 -0.7377 0.7579 -
0.0135 -0.0324 0.2048;-0.1241 -0.5036 -0.1204 0.4299 -0.7377 0.1034 -0.0210 0.2427 -0.5030
0.2909;0.5256 -0.0276 -0.2220 0.1838 0.7579 -0.0210 -1.2062 0.3631 0.3788 -0.2002;-0.4072
0.3416 0.1281 -0.1282 -0.0135 0.2427 0.3631 -0.8486 0.3266 -0.3396;-0.8627 -0.3708 0.5415

0.4196 -0.0324 -0.5030 0.3788 0.3266 0.1946 -0.8253;0.0965 -0.4991 0.4706 -0.6375 0.2048
0.2909 -0.2002 -0.3396 -0.8253 0.6180]

R3=[-1.0782 0.6356 -0.7609 -0.0055 0.5927 -0.1813 -0.0415 0.3175 -0.0236 -0.3502;0.6356 -
0.0556 -0.2380 -0.0097 0.4572 0.4355 -0.3912 0.1064 -0.0886 0.6244;-0.7609 -0.2380 -0.4863
0.7471 -0.1585 -0.1086 -0.0405 0.4157 0.1285 -0.1247;-0.0055 -0.0097 0.7471 0.1508 -0.3595 -
0.4596 -0.0845 -0.1075 0.2475 0.4607;0.5927 0.4572 -0.1585 -0.3595 -0.8581 -0.3846 0.6262
0.3247 -0.2933 0.0572;-0.1813 0.4355 -0.1086 -0.4596 -0.3846 0.6877 0.3819 0.0131 0.4357
0.2391;-0.0415 -0.3912 -0.0405 -0.0845 0.6262 0.3819 -0.3733 0.6565 0.0328 0.0212;0.3175
0.1064 0.4157 -0.1075 0.3247 0.0131 0.6565 0.0499 -0.7576 -0.4196;-0.0236 -0.0886 0.1285
0.2475 -0.2933 0.4357 0.0328 -0.7576 0.1889 0.6876;-0.3502 0.6244 -0.1247 0.4607 0.0572
0.2391 0.0212 -0.4196 0.6876 -0.2251]

Benders Method is applied to the BMI problem

The method lasts 24.8741 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 5.8559 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 4.5472 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

From here, 10 BMIs in the batch related to n=10 and r=4 are presented

BMI problem number 1 in this batch has the following matrices (Rs)

R1=[-0.6296 0.4337 0.3123 0.7377 -0.4085 0.3155 -0.0280 -0.0295 -0.8156 -0.1707;0.4337 -
0.2391 0.0946 0.5786 0.2895 -0.1667 0.5274 0.2822 -0.7094 -0.2902;0.3123 0.0946 -0.4507
0.3835 0.2002 0.4586 0.2463 0.4868 0.6651 0.1535;0.7377 0.5786 0.3835 -1.0691 0.0032 -
0.4692 -0.4321 -0.3969 0.8006 0.3074;-0.4085 0.2895 0.2002 0.0032 -1.0380 -0.0409 -0.0138 -
0.6465 -0.1609 -0.0165;0.3155 -0.1667 0.4586 -0.4692 -0.0409 -0.6502 0.2984 -0.3313 -0.0189
-0.6730;-0.0280 0.5274 0.2463 -0.4321 -0.0138 0.2984 -0.0998 -0.0168 -0.1697 0.7667;-0.0295
0.2822 0.4868 -0.3969 -0.6465 -0.3313 -0.0168 0.5548 -0.1531 0.1760;-0.8156 -0.7094 0.6651
0.8006 -0.1609 -0.0189 -0.1697 -0.1531 0.4835 -0.1323;-0.1707 -0.2902 0.1535 0.3074 -0.0165
-0.6730 0.7667 0.1760 -0.1323 0.1568]

R2=[-0.9517 0.3780 0.4237 -0.7234 0.3637 -0.0740 0.8818 0.3573 -0.3596 0.1034;0.3780
0.0086 0.8721 0.1076 -0.3933 -0.9124 0.0959 0.0035 -0.1008 -0.1920;0.4237 0.8721 0.6848
0.5443 0.2050 -0.1886 0.1736 0.3724 0.2991 0.0883;-0.7234 0.1076 0.5443 0.4322 -0.6658
0.1415 -0.2781 -0.0527 -0.5284 0.5087;0.3637 -0.3933 0.2050 -0.6658 -0.7159 0.1661 0.2360 -
0.2772 -0.1982 0.1698;-0.0740 -0.9124 -0.1886 0.1415 0.1661 0.4439 0.6817 -0.2591 -0.0014 -
0.0815;0.8818 0.0959 0.1736 -0.2781 0.2360 0.6817 0.5971 -0.0236 -0.1298 0.2688;0.3573
0.0035 0.3724 -0.0527 -0.2772 -0.2591 -0.0236 -0.8101 0.4740 -0.0563;-0.3596 -0.1008 0.2991
-0.5284 -0.1982 -0.0014 -0.1298 0.4740 -0.8210 0.0141;0.1034 -0.1920 0.0883 0.5087 0.1698 -
0.0815 0.2688 -0.0563 0.0141 -0.6961]

R3=[-0.4399 0.2822 0.8362 -0.8110 -0.0840 -0.3094 -0.0012 0.0292 0.1551 0.7395;0.2822 -
1.1519 -0.2337 -0.0516 -0.0903 -0.0076 0.0477 -0.1835 -0.4482 -0.0149;0.8362 -0.2337 -1.0764
0.0236 0.2695 0.5862 0.0831 -0.4157 -0.6929 0.5866;-0.8110 -0.0516 0.0236 -0.0825 -0.2352 -
0.4697 0.1098 0.7410 -0.0028 0.8180;-0.0840 -0.0903 0.2695 -0.2352 -1.2834 -0.7224 0.4721 -
0.1786 0.4993 -0.1127;-0.3094 -0.0076 0.5862 -0.4697 -0.7224 -0.0688 0.6114 0.1990 0.4013
0.0457;-0.0012 0.0477 0.0831 0.1098 0.4721 0.6114 0.6606 0.2704 -0.1843 0.4584;0.0292 -
0.1835 -0.4157 0.7410 -0.1786 0.1990 0.2704 0.0998 0.4259 0.8584;0.1551 -0.4482 -0.6929 -
0.0028 0.4993 0.4013 -0.1843 0.4259 -0.2552 -0.4270;0.7395 -0.0149 0.5866 0.8180 -0.1127
0.0457 0.4584 0.8584 -0.4270 -1.2192]

R4=[0.5964 -0.2155 -0.2025 -0.3282 -0.0212 -0.8627 0.6075 0.2416 0.3187 0.3338;-0.2155 -
0.9646 0.4680 -0.1917 0.0236 0.3078 0.0037 0.2509 -0.2957 -0.2114;-0.2025 0.4680 -0.8179
0.4598 0.4110 -0.5168 0.3968 -0.0780 -0.5245 0.4759;-0.3282 -0.1917 0.4598 -0.4320 -0.3256 -

0.2579 0.3779 -0.0608 0.0947 -0.3281;-0.0212 0.0236 0.4110 -0.3256 -0.6792 0.5313 -0.0158
0.1749 0.0326 -0.4945;-0.8627 0.3078 -0.5168 -0.2579 0.5313 0.6472 -0.3553 -0.3533 0.2355
0.0922;0.6075 0.0037 0.3968 0.3779 -0.0158 -0.3553 -0.5369 0.2197 -0.2335 -0.0490;0.2416
0.2509 -0.0780 -0.0608 0.1749 -0.3533 0.2197 -0.7014 0.3094 0.2175;0.3187 -0.2957 -0.5245
0.0947 0.0326 0.2355 -0.2335 0.3094 -0.9533 0.5312;0.3338 -0.2114 0.4759 -0.3281 -0.4945
0.0922 -0.0490 0.2175 0.5312 -0.6636]

Benders Method is applied to the BMI problem

The method lasts 10.2228 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 4.4321 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.4557 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 2 in this batch has the following matrices (Rs)

R1=[-0.6378 0.5926 0.0500 0.4992 0.3941 -0.4427 0.4173 -0.3548 -0.7381 0.0377;0.5926 -
0.1771 0.0491 0.1686 -0.4783 0.7420 0.2096 0.1618 0.2281 -0.0994;0.0500 0.0491 -0.1344 -
0.7161 -0.3869 0.2056 0.1992 0.1710 -0.3623 -0.6125;0.4992 0.1686 -0.7161 -1.0955 0.2185 -
0.2751 -0.3023 0.7855 -0.5382 -0.3438;0.3941 -0.4783 -0.3869 0.2185 -0.7870 0.4935 -0.2291 -
0.0889 -0.0950 0.2685;-0.4427 0.7420 0.2056 -0.2751 0.4935 0.2879 0.6469 0.0286 0.0615 -
0.4917;0.4173 0.2096 0.1992 -0.3023 -0.2291 0.6469 0.6077 -0.2313 0.3102 0.0440;-0.3548
0.1618 0.1710 0.7855 -0.0889 0.0286 -0.2313 -0.1213 0.5971 0.6710;-0.7381 0.2281 -0.3623 -
0.5382 -0.0950 0.0615 0.3102 0.5971 -0.5329 0.6778;0.0377 -0.0994 -0.6125 -0.3438 0.2685 -
0.4917 0.0440 0.6710 0.6778 0.6625]

R2=[-0.1420 -0.6966 -0.2633 -0.3092 0.1399 -0.3655 -0.0664 0.1434 0.3633 0.0882;-0.6966 -
0.3149 -0.2454 0.7620 -0.3985 0.3141 0.2821 -0.0935 -0.5021 -0.2273;-0.2633 -0.2454 -0.4218
-0.2962 0.7838 -0.1522 -0.3762 0.4914 0.2829 -0.2482;-0.3092 0.7620 -0.2962 0.4877 0.0220 -
0.0397 0.0624 0.4721 -0.7261 0.4981;0.1399 -0.3985 0.7838 0.0220 0.4376 0.3593 -0.1136 -
0.0924 -0.0386 -0.6375;-0.3655 0.3141 -0.1522 -0.0397 0.3593 -0.1951 0.1016 -0.9535 0.4437 -
0.0337;-0.0664 0.2821 -0.3762 0.0624 -0.1136 0.1016 0.2354 0.6021 0.0146 -0.2663;0.1434 -
0.0935 0.4914 0.4721 -0.0924 -0.9535 0.6021 0.5119 0.1844 -0.5314;0.3633 -0.5021 0.2829 -
0.7261 -0.0386 0.4437 0.0146 0.1844 -0.7255 -0.1878;0.0882 -0.2273 -0.2482 0.4981 -0.6375 -
0.0337 -0.2663 -0.5314 -0.1878 -0.9617]

R3=[-1.0067 0.2453 0.5424 0.1635 0.7464 -0.6093 0.1705 -0.8289 0.2247 -0.2135;0.2453 -
0.6850 -0.2586 0.0035 -0.0188 0.2710 0.4700 0.2858 -0.2181 0.4955;0.5424 -0.2586 -0.5086 -
0.4483 0.1731 -0.2403 0.2959 -0.4996 -0.2248 0.0377;0.1635 0.0035 -0.4483 -0.6852 -0.1847
0.6749 -0.1566 -0.0676 0.2799 0.0981;0.7464 -0.0188 0.1731 -0.1847 0.2394 -0.6385 -0.3207 -
0.3498 0.6102 0.1619;-0.6093 0.2710 -0.2403 0.6749 -0.6385 -0.8408 0.1195 -0.3973 -0.3922
0.3064;0.1705 0.4700 0.2959 -0.1566 -0.3207 0.1195 -0.3457 0.1940 -0.4049 -0.0364;-0.8289
0.2858 -0.4996 -0.0676 -0.3498 -0.3973 0.1940 -0.1539 -0.7412 0.3480;0.2247 -0.2181 -0.2248
0.2799 0.6102 -0.3922 -0.4049 -0.7412 0.0696 0.1848;-0.2135 0.4955 0.0377 0.0981 0.1619
0.3064 -0.0364 0.3480 0.1848 0.2003]

R4=[0.2559 0.2136 0.5484 -0.0516 0.8770 0.0792 0.0770 -0.4048 0.6533 0.5824;0.2136 -1.0997
0.8152 0.3192 0.4306 0.7904 0.6225 0.0131 0.7319 -0.5385;0.5484 0.8152 -1.1582 -0.1863
0.0356 0.0207 -0.2684 -0.2616 0.3651 -0.7066;-0.0516 0.3192 -0.1863 -0.5136 -0.4315 -0.7146
0.0100 0.3092 0.8327 0.2652;0.8770 0.4306 0.0356 -0.4315 -1.1350 -0.2464 -0.3706 -0.1796
0.2054 -0.8797;0.0792 0.7904 0.0207 -0.7146 -0.2464 -0.6080 0.1906 -0.3571 0.9809 -
0.0009;0.0770 0.6225 -0.2684 0.0100 -0.3706 0.1906 -1.1081 -0.3840 0.0929 -0.0246;-0.4048
0.0131 -0.2616 0.3092 -0.1796 -0.3571 -0.3840 -1.2837 0.3304 -0.2824;0.6533 0.7319 0.3651
0.8327 0.2054 0.9809 0.0929 0.3304 -0.3658 -0.2081;0.5824 -0.5385 -0.7066 0.2652 -0.8797 -
0.0009 -0.0246 -0.2824 -0.2081 -0.8707]

Benders Method is applied to the BMI problem

The method lasts 16.1019 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.3429 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.6942 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 3 in this batch has the following matrices (Rs)

$R1 = \begin{bmatrix} -0.6529 & -0.0633 & -0.2511 & 0.4628 & 0.7556 & 0.2970 & -0.1912 & -0.2439 & 0.4876 & -0.2178; & -0.0633 & -0.5184 & 0.1452 & -0.6774 & -0.0097 & -0.3008 & 0.8608 & 0.0043 & -0.2594 & -0.8525; & -0.2511 & 0.1452 & 0.1329 & -0.7405 & 0.2023 & -0.1791 & -0.0367 & 0.4279 & -0.1385 & -0.7117; & 0.4628 & -0.6774 & -0.7405 & -0.5012 & -0.4335 & 0.1190 & 0.6340 & 0.3654 & -0.6274 & 0.5347; & 0.7556 & -0.0097 & 0.2023 & -0.4335 & -0.5714 & -0.0339 & -0.7107 & 0.3847 & -0.4516 & -0.0092; & 0.2970 & -0.3008 & -0.1791 & 0.1190 & -0.0339 & -1.0360 & -0.3656 & 0.2189 & -0.7217 & -0.5263; & -0.1912 & 0.8608 & -0.0367 & 0.6340 & -0.7107 & -0.3656 & -0.8177 & -0.2118 & 0.7328 & -0.1582; & -0.2439 & 0.0043 & 0.4279 & 0.3654 & 0.3847 & 0.2189 & -0.2118 & -0.6048 & -0.2227 & -0.2538; & 0.4876 & -0.2594 & -0.1385 & - \end{bmatrix}$

0.6274 -0.4516 -0.7217 0.7328 -0.2227 -0.6868 -0.8359;-0.2178 -0.8525 -0.7117 0.5347 -0.0092
-0.5263 -0.1582 -0.2538 -0.8359 -0.5110]

R2=[-1.0761 0.4417 -0.3201 0.7889 -0.1209 -0.0615 -0.5354 0.4596 -0.5739 -0.4732;0.4417 -
0.6684 0.4339 -0.2108 -0.0472 -0.0209 -0.0159 0.3452 0.4357 -0.1629;-0.3201 0.4339 0.5697 -
0.2699 -0.7505 0.0459 -0.2600 0.3040 -0.2790 -0.2004;0.7889 -0.2108 -0.2699 -0.5265 -0.1779
-0.5735 -0.2333 -0.6761 -0.1010 0.0578;-0.1209 -0.0472 -0.7505 -0.1779 -0.4780 -0.6099
0.0816 0.1342 0.4308 0.0289;-0.0615 -0.0209 0.0459 -0.5735 -0.6099 0.1366 0.3535 0.1305 -
0.3219 0.0215;-0.5354 -0.0159 -0.2600 -0.2333 0.0816 0.3535 -1.0406 -0.8397 -0.1946 -
0.5805;0.4596 0.3452 0.3040 -0.6761 0.1342 0.1305 -0.8397 0.2565 -0.1905 0.2461;-0.5739
0.4357 -0.2790 -0.1010 0.4308 -0.3219 -0.1946 -0.1905 -0.8260 -0.4297;-0.4732 -0.1629 -
0.2004 0.0578 0.0289 0.0215 -0.5805 0.2461 -0.4297 -1.2247]

R3=[-0.9223 -0.4091 -0.1362 -0.4288 -0.4270 0.5781 0.8842 -0.2056 -0.3760 0.3348;-0.4091 -
0.2202 0.2128 -0.0980 0.1799 -0.4175 -0.2412 0.0444 0.6264 0.5306;-0.1362 0.2128 -0.8737 -
0.5685 -0.7385 0.6751 -0.5974 0.3569 0.4032 -0.6153;-0.4288 -0.0980 -0.5685 -0.5669 0.5309 -
0.3823 0.0201 0.2862 0.0240 -0.0260;-0.4270 0.1799 -0.7385 0.5309 -0.8810 0.2507 -0.3250 -
0.8687 0.3498 -0.4678;0.5781 -0.4175 0.6751 -0.3823 0.2507 -0.8950 -0.2648 -0.3402 -0.1647
0.1544;0.8842 -0.2412 -0.5974 0.0201 -0.3250 -0.2648 -0.1190 0.1503 -0.2350 0.9018;-0.2056
0.0444 0.3569 0.2862 -0.8687 -0.3402 0.1503 0.4718 -0.5959 -0.7980;-0.3760 0.6264 0.4032
0.0240 0.3498 -0.1647 -0.2350 -0.5959 -0.0155 0.2360;0.3348 0.5306 -0.6153 -0.0260 -0.4678
0.1544 0.9018 -0.7980 0.2360 -0.5978]

R4=[-0.6342 0.4897 0.4299 -0.1380 0.0434 0.4945 -0.4124 -0.0798 0.3446 0.1022;0.4897 -
0.1141 -0.1130 0.1155 -0.2548 -0.0719 0.4156 -0.1361 0.2746 -0.4775;0.4299 -0.1130 -1.1539
0.0257 0.0281 -0.0225 -0.1391 0.5330 0.2017 -0.1270;-0.1380 0.1155 0.0257 -0.9038 0.3341
0.8470 -0.6017 -0.0945 0.0680 0.3129;0.0434 -0.2548 0.0281 0.3341 0.5726 -0.3747 -0.1202
0.2150 -0.4346 0.8370;0.4945 -0.0719 -0.0225 0.8470 -0.3747 -0.8881 -0.4050 -0.2189 0.4183
0.1055;-0.4124 0.4156 -0.1391 -0.6017 -0.1202 -0.4050 -1.0818 0.5735 0.5050 0.1315;-0.0798 -
0.1361 0.5330 -0.0945 0.2150 -0.2189 0.5735 -0.1519 -0.0545 0.1472;0.3446 0.2746 0.2017
0.0680 -0.4346 0.4183 0.5050 -0.0545 -0.6441 -0.5601;0.1022 -0.4775 -0.1270 0.3129 0.8370
0.1055 0.1315 0.1472 -0.5601 -0.8838]

Benders Method is applied to the BMI problem

The method lasts 19.6394 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 5.0501 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 5.7061 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 4 in this batch has the following matrices (Rs)

R1=[-0.7174 -0.1834 0.0563 0.2913 -0.2831 -0.5043 -0.4320 -0.2715 -0.4281 -0.3903;-0.1834 -1.1705 -0.5320 0.3280 0.2570 0.4421 -0.6674 0.7554 0.5635 -0.2260;0.0563 -0.5320 -0.1144 -0.3245 0.3764 0.2294 -0.2240 0.2495 0.1872 -0.2268;0.2913 0.3280 -0.3245 -0.8581 0.5859 -0.0659 -0.5622 -0.0256 0.7306 -0.8796;-0.2831 0.2570 0.3764 0.5859 -1.0694 -0.6617 0.0689 0.5208 0.1170 -0.2144;-0.5043 0.4421 0.2294 -0.0659 -0.6617 -0.5755 0.2336 0.1310 0.2347 -0.0458;-0.4320 -0.6674 -0.2240 -0.5622 0.0689 0.2336 0.0948 -0.0162 -0.0150 0.2630;-0.2715 0.7554 0.2495 -0.0256 0.5208 0.1310 -0.0162 0.6175 0.3418 0.2223;-0.4281 0.5635 0.1872 0.7306 0.1170 0.2347 -0.0150 0.3418 -0.0509 0.6862;-0.3903 -0.2260 -0.2268 -0.8796 -0.2144 -0.0458 0.2630 0.2223 0.6862 0.4591]

R2=[-0.3776 -0.6069 0.6310 0.3575 -0.3508 0.0602 0.6760 0.1122 -0.1638 0.6733;-0.6069 -0.7103 0.1251 -0.0594 -0.1280 0.1094 -0.6300 -0.1599 -0.7364 -0.5293;0.6310 0.1251 0.2169 0.0681 0.3764 0.4968 -0.1030 -0.2691 -0.7830 -0.1549;0.3575 -0.0594 0.0681 0.4127 0.3417 0.2766 -0.1404 -0.3876 -0.1937 -0.0648;-0.3508 -0.1280 0.3764 0.3417 -0.5261 -0.3110 -0.3159 -0.0234 0.2939 -0.2719;0.0602 0.1094 0.4968 0.2766 -0.3110 -0.5946 0.2690 0.2516 0.1477 0.0220;0.6760 -0.6300 -0.1030 -0.1404 -0.3159 0.2690 -0.8391 -0.8427 -0.1543 -0.7360;0.1122

-0.1599 -0.2691 -0.3876 -0.0234 0.2516 -0.8427 -0.7130 0.5431 -0.4697;-0.1638 -0.7364 -
0.7830 -0.1937 0.2939 0.1477 -0.1543 0.5431 0.1004 0.5072;0.6733 -0.5293 -0.1549 -0.0648 -
0.2719 0.0220 -0.7360 -0.4697 0.5072 0.4829]

R3=[-1.1818 0.6076 -0.1822 0.0787 0.0447 0.4788 -0.4510 0.6339 0.0742 0.1731;0.6076 0.0359
0.3584 0.0052 -0.0661 -0.5122 -0.0735 0.1385 0.8764 -0.3655;-0.1822 0.3584 0.5546 0.3929 -
0.9073 -0.3555 0.5948 0.5478 -0.3322 -0.4728;0.0787 0.0052 0.3929 0.5750 0.1310 0.0345
0.5889 -0.3173 0.2668 -0.2360;0.0447 -0.0661 -0.9073 0.1310 -0.3772 -0.8036 0.3333 0.3550
0.0030 0.0988;0.4788 -0.5122 -0.3555 0.0345 -0.8036 -1.0681 0.2860 0.0408 0.3202 0.3869;-
0.4510 -0.0735 0.5948 0.5889 0.3333 0.2860 0.4506 -0.2052 -0.4009 -0.5228;0.6339 0.1385
0.5478 -0.3173 0.3550 0.0408 -0.2052 -0.1460 -0.4453 0.1651;0.0742 0.8764 -0.3322 0.2668
0.0030 0.3202 -0.4009 -0.4453 0.3278 -0.0890;0.1731 -0.3655 -0.4728 -0.2360 0.0988 0.3869 -
0.5228 0.1651 -0.0890 -1.1954]

R4=[-0.8914 -0.0071 -0.8632 0.1969 0.0654 -0.6160 -0.5763 0.4057 -0.3482 0.5208;-0.0071
0.0733 0.0008 0.1662 -0.4800 -0.1890 -0.0164 -0.3160 -0.3844 0.2351;-0.8632 0.0008 -0.2918
0.0557 0.0083 0.1800 -0.0148 0.6691 0.7160 0.3459;0.1969 0.1662 0.0557 -0.7325 0.4136 -
0.5288 -0.0067 0.6101 0.2024 0.1880;0.0654 -0.4800 0.0083 0.4136 -0.9171 -0.5940 -0.4507 -
0.6786 -0.0853 0.3310;-0.6160 -0.1890 0.1800 -0.5288 -0.5940 -0.2777 0.7838 -0.3383 0.2773 -
0.3096;-0.5763 -0.0164 -0.0148 -0.0067 -0.4507 0.7838 0.3117 -0.0883 0.3427 0.1974;0.4057 -
0.3160 0.6691 0.6101 -0.6786 -0.3383 -0.0883 0.6235 0.1005 -0.0047;-0.3482 -0.3844 0.7160
0.2024 -0.0853 0.2773 0.3427 0.1005 -0.1783 -0.3636;0.5208 0.2351 0.3459 0.1880 0.3310 -
0.3096 0.1974 -0.0047 -0.3636 0.3952]

Benders Method is applied to the BMI problem

The method lasts 13.9531 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.5078 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.4181 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 5 in this batch has the following matrices (Rs)

R1=[0.2394 0.1902 0.2047 -0.0878 0.6275 -0.5610 -0.0867 0.1135 0.1822 0.5548;0.1902 0.3684 0.1647 -0.1996 -0.3102 -0.2763 -0.1242 0.2413 -0.0514 -0.0571;0.2047 0.1647 -0.3358 -0.5290 -0.2667 -0.5845 -0.0401 0.0172 0.0890 -0.3685;-0.0878 -0.1996 -0.5290 -0.8432 0.1818 0.0246 0.6898 0.6645 -0.3291 0.0547;0.6275 -0.3102 -0.2667 0.1818 -0.7791 0.1214 -0.1513 -0.5878 -0.6971 0.3572;-0.5610 -0.2763 -0.5845 0.0246 0.1214 -0.5925 0.0082 -0.0420 0.2022 -0.0846;-0.0867 -0.1242 -0.0401 0.6898 -0.1513 0.0082 0.2276 -0.2789 -0.4495 0.1061;0.1135 0.2413 0.0172 0.6645 -0.5878 -0.0420 -0.2789 0.0961 0.4732 0.0125;0.1822 -0.0514 0.0890 -0.3291 -0.6971 0.2022 -0.4495 0.4732 0.5084 -0.3087;0.5548 -0.0571 -0.3685 0.0547 0.3572 -0.0846 0.1061 0.0125 -0.3087 -0.9225]

R2=[-0.4006 0.0428 0.0937 0.3285 0.3535 0.3670 -0.3846 -0.5276 0.1670 0.2578;0.0428 -0.8037 -0.2000 -0.0518 -0.1204 -0.0945 -0.1725 -0.1434 0.4312 0.3384;0.0937 -0.2000 -1.0049 -0.0406 -0.3549 0.7791 -0.6064 -0.4657 0.2110 -0.0544;0.3285 -0.0518 -0.0406 -0.3689 -0.1137 -0.0831 -0.2828 0.4406 0.4151 -0.1943;0.3535 -0.1204 -0.3549 -0.1137 -0.0178 -0.8304 0.7386 0.1443 0.6116 -0.7836;0.3670 -0.0945 0.7791 -0.0831 -0.8304 0.3148 -0.0859 0.4885 -0.7011 0.2884;-0.3846 -0.1725 -0.6064 -0.2828 0.7386 -0.0859 -1.1607 0.1442 -0.2775 -0.0434;-0.5276 -0.1434 -0.4657 0.4406 0.1443 0.4885 0.1442 -1.2665 0.2513 0.1006;0.1670 0.4312 0.2110 0.4151 0.6116 -0.7011 -0.2775 0.2513 -1.0486 -0.6600;0.2578 0.3384 -0.0544 -0.1943 -0.7836 0.2884 -0.0434 0.1006 -0.6600 -1.1019]

R3=[0.4560 -0.0335 0.3449 0.0491 -0.4973 0.4661 0.5545 0.0766 -0.1849 0.0279;-0.0335 -0.3894 -0.1862 0.3741 -0.0858 0.0646 -0.8025 -0.0133 -0.1979 -0.3864;0.3449 -0.1862 0.1547 -0.0189 -0.2702 0.5893 -0.2576 -0.2298 -0.2200 -0.3039;0.0491 0.3741 -0.0189 0.4940 -0.0877 0.2183 -0.2732 0.0849 -0.3187 0.2919;-0.4973 -0.0858 -0.2702 -0.0877 -0.8935 -0.5993 -0.5611 -0.2759 -0.3818 -0.1354;0.4661 0.0646 0.5893 0.2183 -0.5993 -0.1437 -0.1076 0.1799 -0.3318

0.3612;0.5545 -0.8025 -0.2576 -0.2732 -0.5611 -0.1076 0.2354 -0.1445 0.1695 0.3627;0.0766 -
0.0133 -0.2298 0.0849 -0.2759 0.1799 -0.1445 -0.6733 -0.6768 -0.3942;-0.1849 -0.1979 -0.2200
-0.3187 -0.3818 -0.3318 0.1695 -0.6768 0.2668 -0.3873;0.0279 -0.3864 -0.3039 0.2919 -0.1354
0.3612 0.3627 -0.3942 -0.3873 -0.7129]

R4=[0.2408 0.4277 0.7505 -0.2952 0.4157 -0.3057 0.1272 0.2207 -0.0333 -0.1446;0.4277
0.2328 -0.1427 0.3643 -0.3917 -0.2337 0.4072 0.7734 0.0340 -0.7827;0.7505 -0.1427 -0.2029 -
0.1904 0.4034 -0.1106 -0.1328 0.1841 -0.2018 0.5747;-0.2952 0.3643 -0.1904 -1.2797 0.2139
0.8211 -0.2306 -0.7453 -0.3865 0.0137;0.4157 -0.3917 0.4034 0.2139 0.5439 0.1763 -0.0249
0.0076 -0.4376 -0.5091;-0.3057 -0.2337 -0.1106 0.8211 0.1763 0.2851 -0.0322 -0.4944 0.3508 -
0.0127;0.1272 0.4072 -0.1328 -0.2306 -0.0249 -0.0322 -0.7954 0.1372 -0.0163 -0.0151;0.2207
0.7734 0.1841 -0.7453 0.0076 -0.4944 0.1372 -0.4589 0.1141 0.1315;-0.0333 0.0340 -0.2018 -
0.3865 -0.4376 0.3508 -0.0163 0.1141 -1.1405 -0.4417;-0.1446 -0.7827 0.5747 0.0137 -0.5091 -
0.0127 -0.0151 0.1315 -0.4417 -0.0463]

Benders Method is applied to the BMI problem

The method lasts 14.6239 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 2.9422 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.4036 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 6 in this batch has the following matrices (Rs)

R1=[0.2204 -0.0191 -0.0013 0.4263 0.8694 0.2900 -0.2837 -0.5006 -0.1964 0.8839;-0.0191
0.1609 -0.6362 0.6500 -0.3431 -0.2407 0.5195 -0.4679 -0.1715 0.1489;-0.0013 -0.6362 -0.9119
-0.4950 -0.5194 0.2148 -0.1271 0.4404 0.3667 -0.7946;0.4263 0.6500 -0.4950 0.0427 -0.2628 -
0.2110 -0.3724 0.0371 -0.3227 -0.2503;0.8694 -0.3431 -0.5194 -0.2628 -0.3897 -0.0649 0.0838
-0.3366 -0.2876 -0.5719;0.2900 -0.2407 0.2148 -0.2110 -0.0649 0.6491 0.1969 -0.2877 0.5964
0.0630;-0.2837 0.5195 -0.1271 -0.3724 0.0838 0.1969 -0.6647 0.6509 0.6681 -0.4123;-0.5006 -
0.4679 0.4404 0.0371 -0.3366 -0.2877 0.6509 -0.6614 -0.2291 -0.4163;-0.1964 -0.1715 0.3667 -
0.3227 -0.2876 0.5964 0.6681 -0.2291 -0.6561 0.1818;0.8839 0.1489 -0.7946 -0.2503 -0.5719
0.0630 -0.4123 -0.4163 0.1818 -0.5615]

R2=[-0.0278 0.1899 0.1882 -0.5045 -0.2942 -0.3136 0.2297 -0.5195 -0.3221 -0.3041;0.1899 -
1.1430 0.1041 0.0585 0.6999 0.4594 -0.3375 0.5772 -0.0358 -0.2261;0.1882 0.1041 -0.6844
0.6740 0.1394 0.6410 0.0025 0.0648 -0.3781 0.0751;-0.5045 0.0585 0.6740 -0.8912 0.0376
0.1348 0.1133 0.6637 -0.2100 0.7884;-0.2942 0.6999 0.1394 0.0376 -0.6342 0.0023 0.2727 -
0.0973 -0.4039 -0.4122;-0.3136 0.4594 0.6410 0.1348 0.0023 -0.8867 0.4821 0.5672 -0.5167
0.0092;0.2297 -0.3375 0.0025 0.1133 0.2727 0.4821 0.6892 -0.0686 0.5781 -0.1993;-0.5195
0.5772 0.0648 0.6637 -0.0973 0.5672 -0.0686 -0.9451 0.3767 0.1002;-0.3221 -0.0358 -0.3781 -
0.2100 -0.4039 -0.5167 0.5781 0.3767 -0.3815 0.1907;-0.3041 -0.2261 0.0751 0.7884 -0.4122
0.0092 -0.1993 0.1002 0.1907 -0.4008]

R3=[0.0490 0.5675 -0.5597 -0.5152 -0.3352 -0.1766 -0.3455 -0.1541 0.3735 0.6972;0.5675
0.6622 0.0383 0.2229 -0.4250 0.0262 0.1187 -0.1495 0.5368 -0.0850;-0.5597 0.0383 -0.7083 -
0.0980 -0.2585 0.0472 0.0068 -0.3712 -0.6239 -0.4496;-0.5152 0.2229 -0.0980 -1.0073 -0.5493
0.3828 -0.5370 -0.4459 0.1253 -0.1692;-0.3352 -0.4250 -0.2585 -0.5493 0.2347 -0.2000 0.5597
0.1247 0.3913 -0.2983;-0.1766 0.0262 0.0472 0.3828 -0.2000 0.0652 -0.0416 0.6084 0.5400 -
0.3991;-0.3455 0.1187 0.0068 -0.5370 0.5597 -0.0416 -0.9825 -0.8841 0.2694 -0.3111;-0.1541 -
0.1495 -0.3712 -0.4459 0.1247 0.6084 -0.8841 -1.0667 0.4747 0.0453;0.3735 0.5368 -0.6239
0.1253 0.3913 0.5400 0.2694 0.4747 -0.1370 0.0103;0.6972 -0.0850 -0.4496 -0.1692 -0.2983 -
0.3991 -0.3111 0.0453 0.0103 -0.8816]

R4=[-0.0841 -0.0760 -0.4689 0.4151 0.3038 0.7937 0.2311 0.1255 0.3162 -0.0138;-0.0760 -
0.0238 -0.2435 0.5050 0.1063 0.5207 -0.0961 -0.2396 0.2543 -0.8043;-0.4689 -0.2435 -0.0500 -
0.0580 0.0430 -0.1224 -0.7434 -0.1806 -0.7820 -0.2659;0.4151 0.5050 -0.0580 -0.1681 -0.3772

-0.3089 -0.2185 0.0610 -0.1880 -0.0777;0.3038 0.1063 0.0430 -0.3772 -0.3758 -0.1151 0.0540 -
0.2498 -0.2068 -0.0694;0.7937 0.5207 -0.1224 -0.3089 -0.1151 -0.3004 0.5180 -0.3377 -0.5029
-0.0361;0.2311 -0.0961 -0.7434 -0.2185 0.0540 0.5180 0.5929 -0.4141 -0.0354 0.2188;0.1255 -
0.2396 -0.1806 0.0610 -0.2498 -0.3377 -0.4141 0.4512 0.7984 -0.8231;0.3162 0.2543 -0.7820 -
0.1880 -0.2068 -0.5029 -0.0354 0.7984 0.0715 -0.0744;-0.0138 -0.8043 -0.2659 -0.0777 -0.0694
-0.0361 0.2188 -0.8231 -0.0744 -0.0992]

Benders Method is applied to the BMI problem

The method lasts 17.1100 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 4.0359 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 4.9682 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 7 in this batch has the following matrices (Rs)

R1=[-0.8348 0.3212 0.4220 0.4472 -0.2589 0.5967 0.5558 0.2188 0.4438 -0.0902;0.3212 -
0.4810 -0.8314 -0.5989 -0.2182 0.4508 -0.6880 -0.3029 -0.4559 -0.1579;0.4220 -0.8314 -0.7562
0.5276 0.1893 0.7513 0.6035 0.4565 0.4953 0.3453;0.4472 -0.5989 0.5276 -0.2889 -0.8082 -
0.2545 0.1319 0.8399 -0.1179 0.0847;-0.2589 -0.2182 0.1893 -0.8082 -0.8655 0.0894 0.8046
0.0999 -0.8383 -0.4047;0.5967 0.4508 0.7513 -0.2545 0.0894 -0.6254 -0.6344 0.0201 0.2352
0.1129;0.5558 -0.6880 0.6035 0.1319 0.8046 -0.6344 0.2630 0.1631 0.3384 -0.1491;0.2188 -
0.3029 0.4565 0.8399 0.0999 0.0201 0.1631 -1.2338 -0.5646 -0.2976;0.4438 -0.4559 0.4953 -
0.1179 -0.8383 0.2352 0.3384 -0.5646 -1.1756 0.7973;-0.0902 -0.1579 0.3453 0.0847 -0.4047
0.1129 -0.1491 -0.2976 0.7973 -1.0422]

R2=[-0.3720 -0.0448 -0.1686 -0.3813 0.0769 -0.4139 0.3350 0.4407 -0.6602 0.3628;-0.0448 -
1.2501 0.0752 -0.5021 0.3058 0.0843 -0.3370 -0.2111 0.3948 0.7001;-0.1686 0.0752 -1.1757 -
0.2037 0.0484 0.3117 -0.6429 -0.0600 0.0066 -0.1441;-0.3813 -0.5021 -0.2037 -1.2215 0.0857 -
0.3640 0.1966 -0.2499 0.6201 0.3274;0.0769 0.3058 0.0484 0.0857 -0.8586 -0.0044 -0.5120
0.0982 -0.2308 -0.3849;-0.4139 0.0843 0.3117 -0.3640 -0.0044 0.3000 -0.3258 0.0338 -0.8917 -
0.3143;0.3350 -0.3370 -0.6429 0.1966 -0.5120 -0.3258 -0.9326 0.2613 -0.5826 0.7706;0.4407 -
0.2111 -0.0600 -0.2499 0.0982 0.0338 0.2613 0.3646 -0.3728 -0.6473;-0.6602 0.3948 0.0066
0.6201 -0.2308 -0.8917 -0.5826 -0.3728 -0.8710 0.0230;0.3628 0.7001 -0.1441 0.3274 -0.3849 -
0.3143 0.7706 -0.6473 0.0230 -0.4653]

R3=[-0.0499 -0.1672 0.2904 -0.0821 -0.1942 0.1615 -0.7970 0.6307 -0.0019 -0.7488;-0.1672
0.5286 0.5076 -0.0667 -0.5333 -0.0576 0.7557 0.3420 0.6200 0.5889;0.2904 0.5076 0.5763
0.3641 -0.7490 -0.1737 -0.5907 0.0476 -0.7176 0.0732;-0.0821 -0.0667 0.3641 -0.7293 0.7107
0.5039 0.7108 0.4388 -0.1155 -0.0061;-0.1942 -0.5333 -0.7490 0.7107 -0.5160 0.1000 0.4595 -
0.1027 0.3395 0.1359;0.1615 -0.0576 -0.1737 0.5039 0.1000 -0.9544 -0.3731 -0.6803 0.1364 -
0.2121;-0.7970 0.7557 -0.5907 0.7108 0.4595 -0.3731 -0.2789 -0.3513 0.0400 -0.0871;0.6307
0.3420 0.0476 0.4388 -0.1027 -0.6803 -0.3513 0.0364 0.2167 0.2200;-0.0019 0.6200 -0.7176 -
0.1155 0.3395 0.1364 0.0400 0.2167 0.0756 0.0190;-0.7488 0.5889 0.0732 -0.0061 0.1359 -
0.2121 -0.0871 0.2200 0.0190 -0.6626]

R4=[-1.2696 0.0669 -0.3232 -0.2904 -0.2446 0.0689 -0.1783 -0.0470 0.1121 -0.1853;0.0669 -
0.7304 -0.5867 0.2189 0.4375 -0.0733 0.0311 -0.8290 -0.4107 0.0238;-0.3232 -0.5867 0.5087
0.5328 0.7501 -0.2081 0.2666 -0.6107 0.3618 0.0820;-0.2904 0.2189 0.5328 -0.9113 -0.0654 -
0.1441 0.8312 -0.4812 0.5387 0.4519;-0.2446 0.4375 0.7501 -0.0654 -0.3980 -0.3947 0.4766
0.0273 0.2732 0.4664;0.0689 -0.0733 -0.2081 -0.1441 -0.3947 0.0852 0.3033 0.3913 -0.6042
0.2046;-0.1783 0.0311 0.2666 0.8312 0.4766 0.3033 -1.1659 0.2430 0.6000 0.3377;-0.0470 -
0.8290 -0.6107 -0.4812 0.0273 0.3913 0.2430 -0.5740 -0.0465 -0.1937;0.1121 -0.4107 0.3618
0.5387 0.2732 -0.6042 0.6000 -0.0465 -1.0418 -0.1205;-0.1853 0.0238 0.0820 0.4519 0.4664
0.2046 0.3377 -0.1937 -0.1205 0.1680]

Benders Method is applied to the BMI problem

The method lasts 14.5144 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.9639 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.4159 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 8 in this batch has the following matrices (Rs)

R1=[-0.5602 -0.1673 -0.1015 0.5142 0.0278 0.2200 0.4310 0.2039 0.0622 0.0899;-0.1673 -
0.9465 0.4163 0.6630 -0.4671 0.0655 0.5537 -0.0038 -0.6510 -0.8079;-0.1015 0.4163 0.2666
0.8543 -0.2315 -0.1407 0.1421 -0.0048 0.1216 0.5625;0.5142 0.6630 0.8543 -0.0341 0.5188
0.6021 -0.4168 -0.0442 -0.3424 0.3676;0.0278 -0.4671 -0.2315 0.5188 -0.6516 0.1580 -0.1107 -
0.7134 0.1702 -0.0523;0.2200 0.0655 -0.1407 0.6021 0.1580 0.2804 -0.0622 -0.1517 -0.8708 -
0.4722;0.4310 0.5537 0.1421 -0.4168 -0.1107 -0.0622 -0.8426 -0.4258 -0.0553 -0.0324;0.2039 -
0.0038 -0.0048 -0.0442 -0.7134 -0.1517 -0.4258 -0.5910 -0.5386 0.5296;0.0622 -0.6510 0.1216

-0.3424 0.1702 -0.8708 -0.0553 -0.5386 0.0291 0.4406;0.0899 -0.8079 0.5625 0.3676 -0.0523 -
0.4722 -0.0324 0.5296 0.4406 -0.8531]

R2=[0.1397 -0.0073 -0.4055 0.1783 0.6717 0.5461 -0.2251 0.5864 0.4459 -0.2921;-0.0073 -
1.0454 -0.0345 0.2224 0.4989 0.1039 0.1526 -0.2868 0.0866 0.0942;-0.4055 -0.0345 -0.6755 -
0.0906 0.3650 0.0350 -0.0271 0.2797 -0.0114 0.1887;0.1783 0.2224 -0.0906 -1.2480 0.0409
0.5700 0.2862 0.4258 -0.3996 -0.7245;0.6717 0.4989 0.3650 0.0409 -0.6564 0.2300 -0.8626
0.4769 0.7079 0.1992;0.5461 0.1039 0.0350 0.5700 0.2300 0.6376 0.2062 -0.8287 0.5688
0.0226;-0.2251 0.1526 -0.0271 0.2862 -0.8626 0.2062 0.6840 0.6618 0.7214 -0.3198;0.5864 -
0.2868 0.2797 0.4258 0.4769 -0.8287 0.6618 -1.0540 -0.4298 0.1489;0.4459 0.0866 -0.0114 -
0.3996 0.7079 0.5688 0.7214 -0.4298 -0.5416 0.5591;-0.2921 0.0942 0.1887 -0.7245 0.1992
0.0226 -0.3198 0.1489 0.5591 0.0729]

R3=[-0.1626 -0.1351 -0.0471 0.3717 -0.1158 -0.0014 0.1041 0.4331 0.2286 0.4876;-0.1351 -
0.8796 0.6676 0.0920 0.6663 0.1205 0.5985 -0.3230 0.2306 0.4917;-0.0471 0.6676 -0.6328
0.2935 -0.6481 -0.3257 0.2662 -0.2105 0.5576 -0.5948;0.3717 0.0920 0.2935 -0.9256 -0.0499 -
0.2808 -0.2580 0.7554 0.4191 -0.0428;-0.1158 0.6663 -0.6481 -0.0499 -0.0137 -0.4742 0.7867
0.1430 -0.1180 0.1343;-0.0014 0.1205 -0.3257 -0.2808 -0.4742 0.2532 -0.0201 0.3434 -0.0665 -
0.2251;0.1041 0.5985 0.2662 -0.2580 0.7867 -0.0201 -1.1892 0.0502 -0.2189 -0.8023;0.4331 -
0.3230 -0.2105 0.7554 0.1430 0.3434 0.0502 -1.0216 -0.4864 0.3329;0.2286 0.2306 0.5576
0.4191 -0.1180 -0.0665 -0.2189 -0.4864 0.3230 0.2185;0.4876 0.4917 -0.5948 -0.0428 0.1343 -
0.2251 -0.8023 0.3329 0.2185 0.5369]

R4=[-1.2804 0.3750 0.0865 -0.0872 0.5830 -0.3003 -0.0360 -0.0819 0.3592 -0.2775;0.3750 -
0.9341 -0.3981 0.0237 0.6520 0.1315 0.2268 0.0736 0.9559 0.7443;0.0865 -0.3981 -0.1520 -
0.8232 -0.5109 -0.3142 0.0376 0.6610 -0.1188 0.0009;-0.0872 0.0237 -0.8232 0.1237 -0.2160 -
0.2025 -0.5343 0.7983 0.4761 -0.0617;0.5830 0.6520 -0.5109 -0.2160 -0.9304 -0.2180 0.2435 -
0.3748 0.6325 -0.0855;-0.3003 0.1315 -0.3142 -0.2025 -0.2180 -0.1961 -0.1453 0.2289 0.3694
0.3603;-0.0360 0.2268 0.0376 -0.5343 0.2435 -0.1453 -0.5066 0.5462 -0.2466 0.0595;-0.0819
0.0736 0.6610 0.7983 -0.3748 0.2289 0.5462 -1.2537 0.2938 -0.5971;0.3592 0.9559 -0.1188
0.4761 0.6325 0.3694 -0.2466 0.2938 0.0301 -0.7175;-0.2775 0.7443 0.0009 -0.0617 -0.0855
0.3603 0.0595 -0.5971 -0.7175 -0.6279]

Benders Method is applied to the BMI problem

The method lasts 13.9767 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.1041 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.5369 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 9 in this batch has the following matrices (Rs)

R1=[-0.2485 0.0617 -0.4964 -0.3026 -0.1383 0.0492 0.0873 0.4143 0.3117 -0.6882;0.0617 -
0.5679 0.5340 0.8803 0.2429 0.2361 -0.1887 0.2771 -0.2743 0.3347;-0.4964 0.5340 -1.2253
0.0352 0.4280 -0.4826 0.1456 0.5706 -0.2985 0.2802;-0.3026 0.8803 0.0352 -0.5727 -0.1644 -
0.0902 -0.5635 0.3060 -0.9169 0.4150;-0.1383 0.2429 0.4280 -0.1644 -1.1569 -0.5481 -0.0984
0.3988 0.4632 0.4283;0.0492 0.2361 -0.4826 -0.0902 -0.5481 -0.8577 -0.1848 0.0236 0.5530 -
0.5490;0.0873 -0.1887 0.1456 -0.5635 -0.0984 -0.1848 0.6468 -0.5712 -0.2338 -0.0466;0.4143
0.2771 0.5706 0.3060 0.3988 0.0236 -0.5712 -0.4429 -0.3054 0.0968;0.3117 -0.2743 -0.2985 -
0.9169 0.4632 0.5530 -0.2338 -0.3054 -0.8165 0.4430;-0.6882 0.3347 0.2802 0.4150 0.4283 -
0.5490 -0.0466 0.0968 0.4430 -0.9161]

R2=[-0.6202 -0.3591 0.3125 0.1450 0.0202 -0.1092 0.2087 0.4706 0.3393 -0.1215;-0.3591
0.3297 -0.2590 0.9040 0.1314 -0.1280 0.2977 -0.2706 0.1213 0.0427;0.3125 -0.2590 -0.5279 -
0.3121 0.4005 0.4724 0.3335 -0.2154 -0.2969 -0.0111;0.1450 0.9040 -0.3121 -0.0619 -0.1794 -
0.0082 0.2162 -0.5470 0.6874 0.7232;0.0202 0.1314 0.4005 -0.1794 -0.2489 0.0596 0.4069
0.3190 0.3954 -0.1512;-0.1092 -0.1280 0.4724 -0.0082 0.0596 0.3972 0.1991 0.1408 -0.4002 -
0.1642;0.2087 0.2977 0.3335 0.2162 0.4069 0.1991 -0.4513 -0.2629 -0.0180 0.0958;0.4706 -

0.2706 -0.2154 -0.5470 0.3190 0.1408 -0.2629 -0.8214 0.2380 0.1091;0.3393 0.1213 -0.2969
0.6874 0.3954 -0.4002 -0.0180 0.2380 -1.0447 0.5063;-0.1215 0.0427 -0.0111 0.7232 -0.1512 -
0.1642 0.0958 0.1091 0.5063 -0.9001]

R3=[-0.0520 -0.2570 -0.8345 -0.0544 -0.4112 0.2364 -0.2478 0.0119 -0.5474 0.7104;-0.2570 -
0.8300 -0.6006 -0.6469 0.3606 -0.5589 -0.3498 0.2872 0.2853 0.0084;-0.8345 -0.6006 0.4992
0.7617 -0.2308 0.0378 -0.2945 -0.3014 -0.3216 -0.1632;-0.0544 -0.6469 0.7617 -1.0393 -0.4642
0.0091 -0.4553 -0.3466 0.3189 0.2973;-0.4112 0.3606 -0.2308 -0.4642 -1.2197 0.6496 -0.0297
0.0148 -0.5740 0.2933;0.2364 -0.5589 0.0378 0.0091 0.6496 -0.4611 0.4580 0.0245 -0.8054
0.2115;-0.2478 -0.3498 -0.2945 -0.4553 -0.0297 0.4580 0.5628 -0.0526 0.5192 -0.7695;0.0119
0.2872 -0.3014 -0.3466 0.0148 0.0245 -0.0526 0.4116 0.3031 -0.5529;-0.5474 0.2853 -0.3216
0.3189 -0.5740 -0.8054 0.5192 0.3031 0.5202 0.4886;0.7104 0.0084 -0.1632 0.2973 0.2933
0.2115 -0.7695 -0.5529 0.4886 -0.1612]

R4=[0.4699 -0.2976 0.2273 0.0026 0.2891 0.1059 -0.0253 0.8380 -0.2218 0.0292;-0.2976 -
0.8481 0.4833 -0.9337 -0.7090 -0.0566 0.9106 -0.3375 -0.0063 0.5934;0.2273 0.4833 0.4906
0.1524 -0.0985 -0.2779 0.0358 0.0252 0.0188 0.8383;0.0026 -0.9337 0.1524 0.0564 0.4544
0.0131 -0.1375 0.2518 0.1698 0.2872;0.2891 -0.7090 -0.0985 0.4544 -0.9170 0.7513 -0.2234 -
0.2600 0.0186 -0.7554;0.1059 -0.0566 -0.2779 0.0131 0.7513 -0.0006 0.5873 0.6761 0.2410
0.6906;-0.0253 0.9106 0.0358 -0.1375 -0.2234 0.5873 0.4335 -0.2323 -0.0526 -0.2111;0.8380 -
0.3375 0.0252 0.2518 -0.2600 0.6761 -0.2323 -0.0223 -0.4794 0.0651;-0.2218 -0.0063 0.0188
0.1698 0.0186 0.2410 -0.0526 -0.4794 -0.3529 0.5532;0.0292 0.5934 0.8383 0.2872 -0.7554
0.6906 -0.2111 0.0651 0.5532 -0.7594]

Benders Method is applied to the BMI problem

The method lasts 14.0281 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 4.1459 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 2.6121 seconds

The method did not find a feasible solution

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

BMI problem number 10 in this batch has the following matrices (Rs)

R1=[-0.6937 -0.5350 0.9076 -0.6632 -0.0843 0.3077 0.0593 -0.0088 0.3617 -0.2346;-0.5350 -0.1330 -0.1495 -0.1314 0.4095 0.1681 0.3243 0.1365 0.0582 0.0557;0.9076 -0.1495 -1.1908 0.1099 0.3432 -0.4285 0.9125 -0.0421 -0.2753 0.0372;-0.6632 -0.1314 0.1099 -0.8865 -0.0044 0.1616 -0.4446 0.2135 0.1530 -0.6141;-0.0843 0.4095 0.3432 -0.0044 -0.5110 0.3925 -0.1526 -0.1454 -0.9095 0.3754;0.3077 0.1681 -0.4285 0.1616 0.3925 -1.2293 -0.4530 0.0448 0.8329 -0.2169;0.0593 0.3243 0.9125 -0.4446 -0.1526 -0.4530 -1.0730 -0.4502 0.2382 -0.6742;-0.0088 0.1365 -0.0421 0.2135 -0.1454 0.0448 -0.4502 0.3820 -0.9324 0.0627;0.3617 0.0582 -0.2753 0.1530 -0.9095 0.8329 0.2382 -0.9324 -0.5471 0.4232;-0.2346 0.0557 0.0372 -0.6141 0.3754 -0.2169 -0.6742 0.0627 0.4232 0.1135]

R2=[-0.5549 -0.4884 -0.1158 0.2296 -0.3387 -0.1003 0.0886 -0.0289 0.1606 -0.1541;-0.4884 -1.2967 -0.4915 -0.4611 0.6894 -0.0574 0.6465 -0.2083 0.1343 0.2474;-0.1158 -0.4915 0.0305 0.3887 0.0008 0.1977 -0.2545 0.1121 -0.5894 -0.0098;0.2296 -0.4611 0.3887 0.2401 -0.2264 0.2400 0.5645 -0.6544 0.1471 -0.2961;-0.3387 0.6894 0.0008 -0.2264 -1.0853 0.3631 -0.3067 0.5422 0.4677 0.8256;-0.1003 -0.0574 0.1977 0.2400 0.3631 0.4738 -0.2216 -0.1654 0.0311 0.5186;0.0886 0.6465 -0.2545 0.5645 -0.3067 -0.2216 -0.6669 -0.4183 -0.6034 0.2939;-0.0289 -0.2083 0.1121 -0.6544 0.5422 -0.1654 -0.4183 -0.4745 -0.3894 0.3625;0.1606 0.1343 -0.5894 0.1471 0.4677 0.0311 -0.6034 -0.3894 0.1211 0.7996;-0.1541 0.2474 -0.0098 -0.2961 0.8256 0.5186 0.2939 0.3625 0.7996 0.2610]

R3=[-0.4710 0.0465 -0.6732 -0.4501 0.0690 0.0149 0.1254 0.0085 -0.2271 -0.3191;0.0465 0.0086 0.3196 0.3010 -0.0709 0.0439 0.6776 0.2063 -0.1397 0.7860;-0.6732 0.3196 -0.2669 0.3230 -0.5487 -0.0185 0.1642 -0.2730 0.3575 -0.8266;-0.4501 0.3010 0.3230 0.0139 0.1353 -0.2264 0.5010 -0.4279 -0.6109 0.3770;0.0690 -0.0709 -0.5487 0.1353 -1.2981 0.2062 -0.5332 -0.5638 0.4988 0.5586;0.0149 0.0439 -0.0185 -0.2264 0.2062 -0.9796 0.8814 -0.1807 -0.2380

0.3195;0.1254 0.6776 0.1642 0.5010 -0.5332 0.8814 -0.2233 0.1685 0.3658 -0.0040;0.0085
0.2063 -0.2730 -0.4279 -0.5638 -0.1807 0.1685 -0.7635 -0.7131 -0.2259;-0.2271 -0.1397 0.3575
-0.6109 0.4988 -0.2380 0.3658 -0.7131 -0.5483 -0.5534;-0.3191 0.7860 -0.8266 0.3770 0.5586
0.3195 -0.0040 -0.2259 -0.5534 0.2688]

R4=[-0.9370 -0.2122 0.2417 0.3160 -0.1145 -0.2196 -0.5068 -0.1182 -0.2782 0.1109;-0.2122 -
0.8150 -0.0020 -0.8475 -0.2360 -0.3616 -0.0195 0.2592 0.3074 0.7451;0.2417 -0.0020 -0.2805
0.2336 0.3231 0.4462 -0.1324 -0.0771 0.3359 0.5330;0.3160 -0.8475 0.2336 -0.8265 0.1190 -
0.2934 0.6715 0.5611 -0.5037 0.2356;-0.1145 -0.2360 0.3231 0.1190 -0.3992 0.7795 -0.2867 -
0.3098 0.1828 0.6172;-0.2196 -0.3616 0.4462 -0.2934 0.7795 -1.0080 -0.4940 -0.2634 -0.0399 -
0.5440;-0.5068 -0.0195 -0.1324 0.6715 -0.2867 -0.4940 -0.3645 -0.0113 -0.6420 -0.3290;-
0.1182 0.2592 -0.0771 0.5611 -0.3098 -0.2634 -0.0113 0.0949 0.4020 0.4101;-0.2782 0.3074
0.3359 -0.5037 0.1828 -0.0399 -0.6420 0.4020 -0.1042 -0.0519;0.1109 0.7451 0.5330 0.2356
0.6172 -0.5440 -0.3290 0.4101 -0.0519 -0.3131]

Benders Method is applied to the BMI problem

The method lasts 10.1115 seconds

The method did not find a feasible solution

Path Method is applied to the BMI problem

The method lasts 3.7879 seconds

The method did not find a feasible solution

ILMI Method is applied to the BMI problem

The method lasts 8.0574 seconds

The method found a feasible solution given in the following

X=[0.7825 -0.0790 0.0000 0.0819 0.0267 -0.0218 -0.0109 -0.0393 0.0469 -0.0069;-0.0790
0.8641 -0.0084 0.0589 0.0243 -0.0098 0.0139 -0.0083 0.0274 0.0349;0.0000 -0.0084 0.9261
0.0056 -0.0019 0.0057 0.0041 -0.0055 0.0073 -0.0205;0.0819 0.0589 0.0056 0.8630 -0.0585
0.0151 0.0204 0.0063 -0.0760 0.0106;0.0267 0.0243 -0.0019 -0.0585 0.8794 0.0239 -0.0169
0.0294 -0.0144 0.0299;-0.0218 -0.0098 0.0057 0.0151 0.0239 0.8989 0.0006 -0.0196 0.0253
0.0236;-0.0109 0.0139 0.0041 0.0204 -0.0169 0.0006 0.9043 -0.0143 0.0004 -0.0003;-0.0393 -
0.0083 -0.0055 0.0063 0.0294 -0.0196 -0.0143 0.9226 0.0044 0.0020;0.0469 0.0274 0.0073 -

0.0760 -0.0144 0.0253 0.0004 0.0044 0.9175 0.0164;-0.0069 0.0349 -0.0205 0.0106 0.0299
0.0236 -0.0003 0.0020 0.0164 0.9444]

Y=[-0.7312 0.0576 0.0024 -0.0221 0.0314 -0.0055 0.0050 0.0457 -0.0061 -0.0006;0.0576 -
0.7787 -0.0019 -0.0424 0.0029 -0.0118 -0.0362 -0.0098 -0.0041 -0.0885;0.0175 0.0057 -0.8417
-0.0266 -0.0017 -0.0012 0.0049 0.0140 -0.0204 0.0509;-0.0169 -0.0394 -0.0135 -0.8266 0.0697
-0.0082 -0.0351 0.0174 0.0945 -0.0183;0.0313 0.0038 0.0043 0.0744 -0.7671 -0.0332 0.0405 -
0.0340 -0.0012 -0.0688;0.0086 -0.0038 -0.0036 -0.0232 -0.0404 -0.7935 -0.0041 0.0214 -0.0370
-0.0517;-0.0090 -0.0426 -0.0001 -0.0215 0.0431 -0.0078 -0.8067 0.0245 0.0187 -0.0034;0.0316
-0.0158 0.0087 0.0326 -0.0246 0.0138 0.0277 -0.8325 0.0156 -0.0133;0.0144 0.0055 -0.0116
0.0776 -0.0097 -0.0247 0.0176 0.0148 -0.8725 -0.0308;-0.0054 -0.0904 0.0483 -0.0156 -0.0693
-0.0544 -0.0061 -0.0139 -0.0304 -0.8720]

Proposed Method is applied to the BMI problem

The method lasts 0.0000 seconds

The method did not find a feasible solution

