

Extended Data Table 10|Constraint conditions' expression in Step4

Constraint condition 1	$\begin{cases} g_{1_PDF}(\phi_1(\mathbf{z}_1, \mathbf{0}, \sigma_{\mathbf{z}_1})) = \int_{-\infty}^{+\infty} \int_{-\infty}^{+\infty} \int_{-\infty}^{+\infty} \prod_{j=1}^3 \phi_1 \delta(s - f_1(\mathbf{z}_1)) dz_{1_1} dz_{1_2} dz_{1_3} \\ f_1(\mathbf{z}_1) = z_{1_1} + 2z_{1_2} - z_{1_3} \end{cases}$
Constraint condition 2	$\begin{cases} g_{2_PDF}(\phi_2(\mathbf{z}_2, \mathbf{0}, \sigma_{\mathbf{z}_2})) = \int_{-\infty}^{+\infty} \int_{-\infty}^{+\infty} \int_{-\infty}^{+\infty} \prod_{j=1}^3 \phi_2 \delta(s - f_2(\mathbf{z}_2)) dz_{2_1} dz_{2_2} dz_{2_3} \\ f_2(\mathbf{z}_2) = 4z_{2_1} + 3z_{2_2} - 2z_{2_3} \end{cases}$
Constraint condition 3	$\begin{cases} g_{3_PDF}(\phi_3(\mathbf{z}_3, \mathbf{0}, \sigma_{\mathbf{z}_3})) = \int_{-\infty}^{+\infty} \int_{-\infty}^{+\infty} \prod_{j=1}^2 \phi_3 \delta(s - f_3(\mathbf{z}_3)) dz_{3_1} dz_{3_3} \\ f_3(\mathbf{z}_3) = z_{3_1} + 3z_{3_3}^2 \end{cases}$
Constraint condition 4	$\begin{cases} g_{4_PDF}(\phi_4(\mathbf{z}_4, \mathbf{0}, \sigma_{\mathbf{z}_4})) = \int_{-\infty}^{+\infty} \int_{-\infty}^{+\infty} \prod_{j=1}^2 \phi_4 \delta(s - f_4(\mathbf{z}_4)) dz_{4_2} dz_{4_3} \\ f_4(\mathbf{z}_4) = z_{4_2} + 2z_{4_3}^2 \end{cases}$

The design variables included in constraint conditions 1,2 are the same, all of which are x_1, x_2, x_3 ; The design variables included in constraint 3 are x_1 and x_3 ; The design variables included in constraint 4 are x_2 and x_3 . Among them, $z_{1_1}, z_{2_1}, z_{3_1}$ represents the corresponding value of the design variable x_1 in the z-space; $z_{1_2}, z_{2_2}, z_{4_2}$ represents the corresponding value of the design variable x_2 in the z-space; $z_{1_3}, z_{3_3}, z_{4_3}$ represents the corresponding value of the design variable x_3 in the z-space