## Appendix A: Stability of Equilibrium Points and Its Conditions

| Equilibrium point | $\Gamma_{11}$ | $\Gamma_{22}$ | $\Gamma_{33}$ | $\Gamma_{44}$ |
|---|---|---|---|---|
| (0,0,0,0) | $C_r - C_m - C_g + F < 0$ | $C_p - C_{or} - C_t - C_w < 0$ | | |
| (0,1,0,0) | $C_r - C_m - C_g - S_s < 0$ | $C_{or} - C_p + C_t + C_w < 0$ | $B_s - C_f - L_a - L_r - \Delta C < 0$ | |
| (0,1,1,0) | $C_r - C_m - C_g - S_f - S_s < 0$ | $C_{or} - C_p + C_t + C_w - QP_f < 0$ | $C_f - B_s + L_a + L_r + \Delta C < 0$ | $T'\beta - \alpha P_a < 0$ |
| (0,1,1,1) | $C_r - C_m - C_g - S_f - S_s < 0$ | $C_{or} - C_p + C_t + C_w - QP_f < 0$ | $C_f - B_s + L_a + L_r - \alpha P_a + \Delta C < 0$ | $\alpha P_a - T'\beta < 0$ |
| (1,0,0,0) | $C_m + C_g - C_r - F < 0$ | $C_p - C_{or} - C_t - C_w + F + S_s < 0$ | $S_f - L_a - L_r - \Delta C < 0$ | |
| (1,1,0,0) | $C_m + C_g - C_r + S_s < 0$ | $C_{or} - C_p + C_t + C_w - F - S_s < 0$ | $B_s - C_f - L_a - L_r + S_f - \Delta C < 0$ | |
| (1,0,1,0) | $C_g - C_r + C_m + S_f - F - P_g < 0$ | $C_p - C_{or} - C_t - C_w + F + S_s + QP_f < 0$ | $L_a + L_r - S_f + \Delta C < 0$ | |
| (1,1,1,0) | $C_g - C_r + C_m + S_f + S_s < 0$ | $C_{or} - C_p + C_t + C_w - F - S_s - QP_f < 0$ | $C_f - B_s + L_a + L_r - S_f + \Delta C < 0$ | $AT\beta - \alpha P_a < 0$ |
| (1,1,1,1) | $C_m + C_g - C_r + S_s + S_f < 0$ | $C_{or} - C_p + C_t + C_w - F - S_s - QP_f < 0$ | $C_f - B_s + L_a + L_r - S_f - \alpha P_a + \Delta C < 0$ | $\alpha P_a - AT\beta < 0$ |

**Appendix B: Parameter Values**

| Parameter | Assignment | Reference source |
|---|---|---|
| $C_m$ | 5 | According to the "Management Measures for the Special Investment of the Central Budget for Ecological Protection and Restoration," the total funding allocated for agricultural non-point source pollution control projects in a single county typically does not exceed 50 million yuan. Within the expenditure structure of this special fund, costs related to ecological protection supervision are not listed as separate items; instead, they are integrated and distributed across specific project budgets, such as governance and construction, effectively becoming internalized expenses. Based on expert consultations, it is estimated that these supervision costs account for approximately 5% to 15% of the total project funding. For the sake of model construction and standardized processing, we will normalize this implicit cost to a reference unit of 5 million yuan. In subsequent models, other parameters or costs can be compared and adjusted proportionally to this benchmark value, thereby maintaining consistency and comparability within the calculation framework. |
| $C_g$ | 1 | According to data from the China National Certification and Accreditation Administration (CNCA), the annual investment required to establish and maintain a national organic certification system is approximately 100 million CNY. Assuming an allocation of about 1 million CNY per county per year, i.e., 1 million CNY. Considering model relativity, this value is set to 1 (compared to Cm, which is about 1/5) based on expert consultations with professionals from agricultural departments and relevant certification bodies to obtain estimated data. |
| $E_c$ | 5 | The estimate is based on reductions in nitrogen and phosphorus emissions, carbon emission decreases, and their associated monetary values (Wang et al., 2024; Albtoosh et al., 2024). The environmental benefit of reducing chemical fertilizer use is approximately 5,000 CNY per ton, accounting for decreased water and air pollution, among other factors. Assuming that promoting organic fertilizer can reduce chemical fertilizer use by 1,000 tons per county, the total benefit would be 5 million CNY. |
| $S_s$ | 2 | According to the "Huaiyuan County 2024 Commercial Organic Fertilizer Promotion and Application Subsidy Project Implementation Plan, subsidy standard is set at 200 CNY per ton. By the end of 2024, the county promoted and applied 5,000 tons of commercial organic fertilizer, with subsidy funds totaling 1 million CNY. Assuming a sales volume of 10,000 tons, normalized to one unit, the value is set to 2 (unit: million CNY). |

| Parameter | Assignment | Reference source |
|---|---|---|
| $S_f$ | 2 | According to the "Huaiyuan County Timely Allocation of 2024 Commercial Organic Fertilizer Promotion and Application Subsidy Project Funds, Huaiyuan County allocated a total of 1 million CNY for the 2024 project. This subsidy supports eight organic fertilizer suppliers and benefits 46 fertilizer purchasers across 13 townships, covering 10,538.9 acres with the application of 5,000 tons of organic fertilizer. Assuming a sales volume of 10,000 tons, normalized to one unit, the value is set to 2 (unit: million CNY). |
| F | 0.1 | According to the "Regulations on the Prevention and Control of Pollution from Large-scale Livestock and Poultry Breeding," if a livestock or poultry farm or breeding community begins production or operation without constructing the necessary pollution prevention and control facilities, or if self-constructed facilities fail to meet standards, or if they do not entrust a third party for the comprehensive utilization and harmless treatment of breeding waste, or if the constructed pollution prevention and control facilities do not operate properly, the environmental protection authorities of local people's governments at or above the county level shall order the cessation of production or use and may impose a fine of up to 100,000 CNY. This amount is equivalent to 0.1 million CNY. |
| $P_g$ | 2 | Positive political recognition resulting from the successful promotion of policies by local governments constitutes a non-monetary benefit that significantly influences governmental decision-making. Assuming the successful promotion of organic fertilizers leads to commendations from higher authorities, career advancements, and similar outcomes, this benefit is quantified as an economic value of approximately 2 million CNY. |
| $C_r$ | 16 | When the government adopts the "Not Promote" strategy, it suffers a loss of public trust and faces negative public opinion due to tacitly condoning pollution, demonstrating inaction, and undermining the credibility of the certification system. This results in a negative non-monetary cost, estimated at 16 million CNY. |
| $C_w$ | 0.6 | Based on data from 26 professional manure removal service organizations in Pujiang County, the average direct cost for a 4 $m^3$ truck operated by two personnel is approximately 120 CNY per truck. This cost primarily includes fuel, vehicle maintenance, wages, and insurance. The cost of collecting and storing one ton of manure is about 30 CNY. Assuming the treatment of 20,000 tons, the total cost would be 0.6 million CNY. |

| Parameter | Assignment | Reference source |
|---|---|---|
| $C_t$ | 4 | Defining the life cycle of pig manure as including collection, treatment, transportation, and utilization stages, Zhou et al. (2021) studied the economic benefits of using pig manure as one of the raw materials for producing compound organic fertilizer. They calculated the life cycle cost of the compound organic fertilizer to be 675.75 yuan per ton, with raw material costs accounting for more than 70% of the total cost (Zhou et al., 2021). Assuming a treatment volume of 20,000 tons, the total cost would be 4 million yuan. |
| $C_{or}$ | 0.05 | According to the "Organic Product Certification Fee Management Rules" and China's organic product certification fee standards, the annual cost for an enterprise to apply for organic certification is approximately 50,000 CNY. Assuming the ORP pays 50,000 CNY, i.e., 0.05 (million CNY). Set to 0.05 to match other costs. |
| $P_f$ | 6 | Based on market research, the average selling price of organic fertilizer is 600 yuan per ton. Assuming sales of 10,000 tons, the revenue is 6 million CNY, i.e., 6 (million CNY). |
| Q | 1 | Assuming that when TAP cultivates, sales volume is 10,000 tons (i.e., 10k units, 1 ton/unit), corresponding to sales of 6 million CNY. When TAP does not cultivate, Q = 0. |
| $C_p$ | 100 | According to calculations based on the "Regulations on the Prevention and Control of Pollution from Scale Livestock and Poultry Breeding," the treatment cost for waste generated per slaughtered hog to achieve compliant discharge is approximately 200 CNY. Based on the survey of pig farming in Huaiyuan County at the end of 2019, the total number of slaughtered hogs in the county was 538,000. Based on this calculation, the cost amounts to 107.6 million CNY. This value is set to 100 (million CNY) in the model. |
| $\Delta C$ | 2 | Data from Huaiyuan County. Conventional fertilizer cost is about 2700 CNY/ton, organic fertilizer cost is about 360 CNY/ton, but application rates may differ, increasing total cost. Studies show organic fertilizer application costs 10-50% more than chemical fertilizer. Assuming chemical fertilizer cost is 100 CNY/mu, organic fertilizer cost is 120 CNY/mu, an increase of 20 CNY/mu. Assuming 100,000 mu in the county, the total cost increase is 2 million CNY, i.e., 2 (million CNY). |
| $C_f$ | 0.01 | According to the "Organic Product Certification Fee Management Rules, the certification fee for an individual farmer is about 10,000 CNY/year. Set to 0.01 (million CNY). |

| Parameter | Assignment | Reference source |
|---|---|---|
| $L_r$ | 5 | Based on experimental data (Guzmán et al., 2011), initial organic fertilizer application may reduce yield by 5%. Assuming an output value of 1000 CNY/mu, the loss is 50 CNY/mu. For 100,000 mu, the loss is 5 million CNY, i.e., 5 (million CNY). |
| $L_a$ | 1 | Applying organic fertilizer requires more labor (Priya & Singh, 2023). Assuming an increase of 10 CNY/mu in labor costs, for 100,000 mu, the increase is 1 million CNY, i.e., 1 (million CNY). |
| $\alpha P_a$ | 75 | The premium rate for organic agricultural products is generally 75% (Liu et al., 2020). Assuming the conventional output value is 1000 CNY/mu, a 75% premium increases it by 750 CNY/mu. For 100,000 mu, the increase is 75 million CNY, i.e., 75 (million CNY). Set to 75. |
| $B_s$ | 5 | Long-term benefits from soil improvement are difficult to quantify. Annual soil improvement can be equivalent to a 5% yield increase/mu, i.e., 50 CNY/mu. For 100,000 mu, the benefit is 5 million CNY, i.e., 5 (million CNY). |
| $\beta$ | 150 | Assumed equivalent to 200% of the paid premium. If the premium paid is 75 million CNY, the environmental utility is 150 million CNY. |
| $T$ | 0.7 | Initial value set to 0.7 (when the government promotes), indicating 70% consumer trust in organic certification. T': Trust level when government does not promote, set to 0.3. |
| $D$ | -5 | Building on this, in multi-attribute decision analysis, regret theory measures consumer regret when outcomes are worse than expected. Yan et al. (2024) proposed a three-way classification and ranking method based on regret theory and TOPSIS for handling diverse attributes. Disappointment utility is -5 (million CNY). |
| $A$ | 0.9 | In a related context, the initial value is set to 0.9. |

**References for Supplementary Data**

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## Appendix C: MATLAB Code for Evolutionary Game Simulation

### 1 Replicator_Dynamics.m

```
syms w x y z Cm Cg Ec Ss Sf F Pg Cr Cw Ct Cor Pf Q Cp dtC Cf Lr La afPa Bs bt T
        Tp D A
E1=y*Pg+x*y*Ec-x*Ss-y*Sf+F-x*F-Cm-Cg;
E2=x*y*(Ec+Pg)-Cr;
dw=w*(1-w)*(E1-E2);
simplify(dw)
E3=y*Pf*Q+w*Ss-Cw-Ct-Cor;
E4=-w*F-Cp;
dx=x*(1-x)*(E3-E4);
simplify(dx)
E5=x*z*afPa+x*Bs-x*Cf+w*Sf-dtC-Lr-La;
E6=0;
dy=y*(1-y)*(E5-E6);
simplify(dy)
E7=x*y*[w*(-afPa+T*A*bt)+(1-w)*(-afPa+Tp*bt)]+(1-x*y)*D;
E8=0;
dz=z*(1-z)*(E7-E8);
simplify(dz)
```

**2 Jacobian_EigenAnalysis.m**

```
clc;clear;
syms w x y z Cm Cg Ec Ss Sf F Pg Cr Cw Ct Cor Pf Q Cp dtC Cf Lr La afPa Bs bt T
Tp D A
%Simply assign a value to obtain the eigenvalue %Cm=5; Cg=1; Ec=5; Ss=2; Sf=2;
F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05; Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01;
Lr=5; La=1; afPa=75; Bs=10; bt=150; T=0.7; Tp=0.3; D=-5; A=0.9;
dw=w*(w - 1)*(Cg + Cm - Cr - F + F*x - Pg*y + Ss*x + Sf*y + Pg*x*y);
dx=-x*(x - 1)*(Cp - Cor - Ct - Cw + F*w + Ss*w + Pf*Q*y);
dy=y*(y - 1)*(La + Lr + dtC - Bs*x + Cf*x - Sf*w - afPa*x*z);
dz=z*(D*(x*y - 1) - x*y*((w - 1)*(afPa - Tp*bt) - w*(afPa - A*T*bt)))*(z - 1);
dww=diff(dw,w);
dwx=diff(dw,x);
dwy=diff(dw,y);
dwz=diff(dw,z);
dxw=diff(dx,w);
dxx=diff(dx,x);
dxy=diff(dx,y);
dxz=diff(dx,z);
dyw=diff(dy,w);
dyx=diff(dy,x);
dyy=diff(dy,y);
```

```
dyz=diff(dy,z);

dzw=diff(dz,w);

dzx=diff(dz,x);

dzy=diff(dz,y);

dzz=diff(dz,z);

Jacobian=[[dww, dwx, dwy, dwz];[dxw, dxx, dxy, dxz];[dyw, dyx, dyy, dyz];[dzw, dzx,

        dzy, dzz]]

%(0,0,0,0)

w = 0;

x = 0;

y = 0;

z = 0;

A1=eval(Jacobian)

%(0,1,0,0)

w = 0;

x = 1;

y = 0;

z = 0;

A2=eval(Jacobian)

%(0,0,1,0)

w = 0;

x = 0;
```

```
y = 1;

z = 0;

A3=eval(Jacobian)

%(0,0,0,1)

w = 0;

x = 0;

y = 0;

z = 1;

A4=eval(Jacobian)

%(0,1,1,0)

w = 0;

x = 1;

y = 1;

z = 0;

A5=eval(Jacobian)

%(0,1,0,1)

w = 0;

x = 1;

y = 0;

z = 1;

A6=eval(Jacobian)

%(0,0,1,1)
```

```
w = 0;

x = 0;

y = 1;

z = 1;

A7=eval(Jacobian)

%(0,1,1,1)

w = 0;

x = 1;

y = 1;

z = 1;

A8=eval(Jacobian)

%(1,0,0,0)

w = 1;

x = 0;

y = 0;

z = 0;

A9=eval(Jacobian)

%(1,1,0,0)

w = 1;

x = 1;

y = 0;

z = 0;
```

A10=eval(Jacobian)

%(1,0,1,0)

w = 1;

x = 0;

y = 1;

z = 0;

A11=eval(Jacobian)

%(1,0,0,1)

w = 1;

x = 0;

y = 0;

z = 1;

A12=eval(Jacobian)

%(1,1,1,0)

w = 1;

x = 1;

y = 1;

z = 0;

A13=eval(Jacobian)

%(1,1,0,1)

w = 1;

x = 1;

```
y = 0;

z = 1;

A14=eval(Jacobian)

%(1,0,1,1)

w = 1;

x = 0;

y = 1;

z = 1;

A15=eval(Jacobian)

%(1,1,1,1)

w = 1;

x = 1;

y = 1;

z = 1;

A16=eval(Jacobian)
```

**3 Initial_Value_Simulation.m**

**3.1 Main equation**

```
function dydt=mufangcheng(t,y)

Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;

        Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150;

        T=0.7; Tp=0.3; D=-5; A=0.9;dydt=zeros(4,1);
```

```
dydt(1)=y(1)*(y(1) - 1)*(Cg + Cm - Cr - F + F*y(2) - Pg*y(3) + Ss*y(2) + Sf*y(3) +
        Pg*y(2)*y(3));
dydt(2)=-y(2)*(y(2) - 1)*(Cp - Cor - Ct - Cw + F*y(1) + Ss*y(1) + Pf*Q*y(3));
dydt(3)=y(3)*(y(3) - 1)*(La + Lr + dtC - Bs*y(2) + Cf*y(2) - Sf*y(1) -
        afPa*y(2)*y(4));
dydt(4)=y(4)*(D*(y(2)*y(3) - 1) - y(2)*y(3)*((y(1) - 1)*(afPa - Tp*bt) - y(1)*(afPa -
        A*T*bt)))*(y(4) - 1);
End
```

**3.2 The Evolution of Assignment**

```
clear;clc;
for i=1
    for j=0.1:0.1:0.9%
    for k=0.1:0.1:0.9%
    for l=0.1:0.1:0.9%
    [t,y]=ode45('mufangcheng',[0 5],[i j k l]);
    plot3(y(:,2),y(:,3),y(:,4));
        xlabel('x');ylabel('y');zlabel('z');
        grid on;
    hold on
    axis([0 1 0 1 0 1]);
    end
    end
```

```
    end
End
```

### 3.3 Main equation（No assignment）

```
function dydt=mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q, Cp,
        dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A)
dydt=zeros(4,1);
dydt(1)=y(1)*(y(1) - 1)*(Cg + Cm - Cr - F + F*y(2) - Pg*y(3) + Ss*y(2) + Sf*y(3) +
        Pg*y(2)*y(3));
dydt(2)=-y(2)*(y(2) - 1)*(Cp - Cor - Ct - Cw + F*y(1) + Ss*y(1) + Pf*Q*y(3));
dydt(3)=y(3)*(y(3) - 1)*(La + Lr + dtC - Bs*y(2) + Cf*y(2) - Sf*y(1) -
        afPa*y(2)*y(4));
dydt(4)=y(4)*(D*(y(2)*y(3) - 1) - y(2)*y(3)*((y(1) - 1)*(afPa - Tp*bt) - y(1)*(afPa -
        A*T*bt)))*(y(4) - 1);
End
```

### 3.4 The Impact of Changes in the *w* Value

```
clc,clear;
figure('Units', 'centimeters', 'Position', [0 0 18 15])
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
        Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150;
        T=0.7; Tp=0.3; D=-5; A=0.9;dydt=zeros(4,1);
alphas = linspace(0, 1, 21);
result = sin(2 * pi * alphas);
```

```
result_low = result - 0.2;

result_mid = result + 0.2;

result_hig = result + 0.4;

[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A) ,[1 10],[0 0.5 0.5 0.5] );

plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0 0.4470
        0.7410],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));

hold on;

[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A) ,[1 10],[0.1 0.5 0.5
        0.5] );%#ok<*NOPTS>

plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.8500 0.3250
        0.0980]','linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));

hold on;

[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);

plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.4940 0.1840
        0.5560],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));

hold on;

[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A) ,[1 10],[0.7 0.5 0.5 0.5] );

plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.4660 0.6740
```

```
    0.1880],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,   Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
    Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.9 0.5 0.5 0.5]);
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.6350 0.0780
    0.1840],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
grid on
ax = gca;
ax.FontSize = 15;
set(gca,'FontName','Times New Roman');
xlabel('$x$','interpreter','latex','Rotation',0,'FontSize',20,'FontName','Times New
    Roman');
ylabel('$y$','interpreter','latex','FontSize',20,'FontName','Times New Roman');
zlabel('$z$','interpreter','latex','FontSize',20,'FontName','Times New Roman');
set(gca,'XTick',[0:0.2:1],'YTick',[0:0.2:1],'ZTick',[0:0.2:1])
axis([0 1 0 1 0 1]);
lgd = legend('w=0','w=0.1','w=0.5','w=0.7','w=0.9');
lgd.FontSize = 30;
lgd.FontName = 'Times New Roman';
lgd.FontAngle = 'italic';
```

### 3.5 The Impact of Changes in the *x* Value

```
clc;clear;
figure('Units', 'centimeters', 'Position', [0 0 18 15]);
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
        Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150;
        T=0.7; Tp=0.3; D=-5; A=0.9;dydt=zeros(4,1);
alphas = linspace(0, 1, 21);
result = sin(2 * pi * alphas);
result_low = result - 0.2;
result_mid = result + 0.2;
result_hig = result + 0.4;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A) ,[1 10],[0.5 0.1 0.5 0.5] );
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0 0.4470
        0.7410],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A) ,[1 10],[0.5 0.3 0.5 0.5] );
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.8500 0.3250
        0.0980]','linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
```

```
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.4940 0.1840
        0.5560],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A) ,[1 10],[0.5 0.7 0.5 0.5] );
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.4660 0.6740
        0.1880],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.9 0.5 0.5]);
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.6350 0.0780
        0.1840],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
grid on;
ax = gca;
ax.FontSize = 15;
set(gca,'FontName','Times New Roman');
xlabel('$x$','interpreter','latex','Rotation',0,'FontSize',20,'FontName','Times New
        Roman');
ylabel('$y$','interpreter','latex','FontSize',20,'FontName','Times New Roman');
zlabel('$z$','interpreter','latex','FontSize',20,'FontName','Times New Roman');
set(gca,'XTick',[0:0.2:1],'YTick',[0:0.2:1],'ZTick',[0:0.2:1]);
```

```
axis([0 1 0 1 0 1]);
lgd = legend('x=0.1','x=0.3','x=0.5','x=0.7','x=0.9');
lgd.FontSize = 30;
lgd.FontName = 'Times New Roman';
lgd.FontAngle = 'italic';
```

**3.6 The Impact of Changes in the *y* Value**

```
clc;clear;
figure('Units', 'centimeters', 'Position', [0 0 18 15]);
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
        Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150;
        T=0.7; Tp=0.3; D=-5; A=0.9;dydt=zeros(4,1);
alphas = linspace(0, 1, 21);
result = sin(2 * pi * alphas);
result_low = result - 0.2;
result_mid = result + 0.2;
result_hig = result + 0.4;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A) ,[1 10],[0.5 0.5 0.1 0.5] );
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0 0.4470
        0.7410],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
```

```
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A) ,[1 10],[0.5 0.5 0.3 0.5] );
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.8500 0.3250
        0.0980]','linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.4940 0.1840
        0.5560],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A) ,[1 10],[0.5 0.5 0.7 0.5] );
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.4660 0.6740
        0.1880],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.9 0.5]);
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.6350 0.0780
        0.1840],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
grid on;
ax = gca;
ax.FontSize = 15;
```

```
set(gca,'FontName','Times New Roman');
xlabel('$x$','interpreter','latex','Rotation',0,'FontSize',20,'FontName','Times New
    Roman');
ylabel('$y$','interpreter','latex','FontSize',20,'FontName','Times New Roman');
zlabel('$z$','interpreter','latex','FontSize',20,'FontName','Times New Roman');
set(gca,'XTick',[0:0.2:1],'YTick',[0:0.2:1],'ZTick',[0:0.2:1]);
axis([0 1 0 1 0 1]);
lgd = legend('y=0.1','y=0.3','y=0.5','y=0.7','y=0.9');
lgd.FontSize = 30;
lgd.FontName = 'Times New Roman';
lgd.FontAngle = 'italic';
```

**3.7 The Impact of Changes in the w Value**

```
clc;clear;
figure('Units', 'centimeters', 'Position', [0 0 18 15]);
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
    Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150;
    T=0.7; Tp=0.3; D=-5; A=0.9;dydt=zeros(4,1);
alphas = linspace(0, 1, 21);
result = sin(2 * pi * alphas);
result_low = result - 0.2;
result_mid = result + 0.2;
result_hig = result + 0.4;
```

```
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A) ,[1 10],[0.5 0.5 0.5 0.1] );
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0 0.4470
        0.7410],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A) ,[1 10],[0.5 0.5 0.5 0.3] );
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.8500 0.3250
        0.0980]','linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.4940 0.1840
        0.5560],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A) ,[1 10],[0.5 0.5 0.5 0.7] );
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.4660 0.6740
        0.1880],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
        Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.9]);
```

```
plot3(y(:,2),y(:,3),y(:,4),'-', 'Color', [0.6350 0.0780
        0.1840],'linewidth',2,'markersize',4,'MarkerIndices',1:2:length(t));
hold on;
grid on;
ax = gca;
ax.FontSize = 15;
set(gca,'FontName','Times New Roman');
xlabel('$x$','interpreter','latex','Rotation',0,'FontSize',20,'FontName','Times New
        Roman');
ylabel('$y$','interpreter','latex','FontSize',20,'FontName','Times New Roman');
zlabel('$z$','interpreter','latex','FontSize',20,'FontName','Times New Roman');
set(gca,'XTick',[0:0.2:1],'YTick',[0:0.2:1],'ZTick',[0:0.2:1]);
axis([0 1 0 1 0 1]);
lgd = legend('z=0.1','z=0.3','z=0.5','z=0.7','z=0.9');
lgd.FontSize = 30;
lgd.FontName = 'Times New Roman';
lgd.FontAngle = 'italic';
```

**4. Sensitivity_Analysis.m**

**4.1 Sensitivity analysis of cost-related parameters**

**4.1.1 Effects of Government Regulatory Costs on the Strategy Evolution of Stakeholders**

```
clc;clear;
```

```
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150; T=0.7;
Tp=0.3; D=-5; A=0.9;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
dices',1:5:length(t));
hold on;
Cm=15; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150; T=0.7;
Tp=0.3; D=-5; A=0.9;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
dices',1:5:length(t));
hold on;
Cm=15; Cg=10; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150; T=0.7;
Tp=0.3; D=-5; A=0.9;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
```

```
dices',1:5:length(t));
hold on;
grid on;
ax = gca;
ax.FontSize = 16;
xlabel('$t$','interpreter','latex','Rotation',0,'FontSize',35);
ylabel('$p$','interpreter','latex','FontSize',35);
set(gca,'XTick',[0:0.2:1],'YTick',[0:0.2:1],'ZTick',[0:0.2:1]);
axis([0 1 0 1 0 1]);
legend('Cm+Cg<Cr,w','Cm+Cg<Cr,x','Cm+Cg<Cr,y','Cm+Cg<Cr,z','Cm+Cg=Cr,w','C
m+Cg=Cr,x','Cm+Cg=Cr,y','Cm+Cg=Cr,z','Cm+Cg>Cr,w','Cm+Cg>Cr,x','Cm+Cg>Cr,
y','Cm+Cg>Cr,z','FontSize',22);
```

### 4.1.2 Impact of Changes in ORP Cost Parameters on the Strategic Evolution of Each Game Agent

```matlab
clc;clear;
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
Pf=6; Q=1; Cp=0; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150; T=0.7;
Tp=0.3; D=-5; A=0.9;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
```

```
dices',1:8:length(t));
hold on;
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
Pf=6; Q=1; Cp=3.35; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150; T=0.7;
Tp=0.3; D=-5; A=0.9;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
dices',1:8:length(t));
hold on;
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150; T=0.7;
Tp=0.3; D=-5; A=0.9;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
dices',1:8:length(t));
hold on;
grid on;
ax = gca;
ax.FontSize = 20;
xlabel('$t$','interpreter','latex','Rotation',0,'FontSize',35);
```

```
ylabel('$p$','interpreter','latex','FontSize',35);
set(gca,'XTick',[0:0.2:1],'YTick',[0:0.2:1],'ZTick',[0:0.2:1]);
axis([0 1 0 1 0 1]);
legend('Cor+Ct+Cw<QPf+Ss-Cp,w','Cor+Ct+Cw<QPf+Ss-Cp,x','Cor+Ct+Cw<QPf+
Ss-Cp,y','Cor+Ct+Cw<QPf+Ss-Cp,z','Cor+Ct+Cw=QPf+Ss-Cp,w','Cor+Ct+Cw=QPf
+Ss-Cp,x','Cor+Ct+Cw=QPf+Ss-Cp,y','Cor+Ct+Cw=QPf+Ss-Cp,z','Cor+Ct+Cw>QPf
+Ss-Cp,w','Cor+Ct+Cw>QPf+Ss-Cp,x','Cor+Ct+Cw>QPf+Ss-Cp,y','Cor+Ct+Cw>QP
f+Ss-Cp,z','FontSize',25);
```

### 4.2 Sensitivity analysis of revenue-related parameters

```
clc;clear;
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=0.5; Bs=10; bt=150; T=0.7;
Tp=0.3; D=-5; A=0.9;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
dices',1:8:length(t));
hold on;
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=1.01; Bs=10; bt=150; T=0.7;
Tp=0.3; D=-5; A=0.9;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
```

```
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
dices',1:8:length(t));
hold on;
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150; T=0.7;
Tp=0.3; D=-5; A=0.9;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
dices',1:8:length(t));
hold on;
grid on;
ax = gca;
ax.FontSize = 20;
xlabel('$t$','interpreter','latex','Rotation',0,'FontSize',35);
ylabel('$p$','interpreter','latex','FontSize',35);
set(gca,'XTick',[0:0.2:1],'YTick',[0:0.2:1],'ZTick',[0:0.2:1]);
axis([0 1 0 1 0 1]);
legend('Cf+La+Lr+dtC>Bs+Sf+afPa,w','Cf+La+Lr+dtC>Bs+Sf+afPa,x','Cf+La+Lr+d
tC>Bs+Sf+afPa,y','Cf+La+Lr+dtC>Bs+Sf+afPa,z','Cf+La+Lr+dtC=Bs+Sf+afPa,w','C
f+La+Lr+dtC=Bs+Sf+afPa,x','Cf+La+Lr+dtC=Bs+Sf+afPa,y','Cf+La+Lr+dtC=Bs+Sf
```

+afPa,z','Cf+La+Lr+dtC<Bs+Sf+afPa,w','Cf+La+Lr+dtC<Bs+Sf+afPa,x','Cf+La+Lr+dtC<Bs+Sf+afPa,y','Cf+La+Lr+dtC<Bs+Sf+afPa,z','FontSize',25);

**4.3 Sensitivity analysis of policy-related parameters**

```
clc;clear;
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150; T=0.7;
Tp=0.3; D=-5; A=0.9;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
dices',1:9:length(t));
hold on;
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=4; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05; Pf=6;
Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150; T=0.7; Tp=0.3;
D=-5; A=0.9;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
dices',1:9:length(t));
hold on;
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=5; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05; Pf=6;
Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150; T=0.7; Tp=0.3;
```

```
D=-5; A=0.9;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
dices',1:9:length(t));
hold on;
grid on;
ax = gca;
ax.FontSize = 20;
xlabel('$t$','interpreter','latex','Rotation',0,'FontSize',35);
ylabel('$p$','interpreter','latex','FontSize',35);
set(gca,'XTick',[0:0.2:1],'YTick',[0:0.2:1],'ZTick',[0:0.2:1]);
axis([0 1 0 1 0 1]);
legend('Sf+Ss>F,w','Sf+Ss>F,x','Sf+Ss>F,y','Sf+Ss>F,z','Sf+Ss=F,w','Sf+Ss=F,x','Sf+S
s=F,y','Sf+Ss=F,z','Sf+Ss<F,w','Sf+Ss<F,x','Sf+Ss<F,y','Sf+Ss<F,z','FontSize',25);
```

**4.4 Sensitivity analysis of trust-related parameters**

```
clc;clear;
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=37; T=0.3;
Tp=0.3; D=-5; A=0.3;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
```

```
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
dices',1:9:length(t));
hold on;
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=75; T=0.5;
Tp=0.3; D=-5; A=0.6;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
dices',1:9:length(t));
hold on;
Cm=5; Cg=1; Ec=5; Ss=2; Sf=2; F=0.1; Pg=2; Cr=16; Cw=0.6; Ct=4; Cor=0.05;
Pf=6; Q=1; Cp=100; dtC=2; Cf=0.01; Lr=5; La=1; afPa=75; Bs=10; bt=150; T=0.7;
Tp=0.3; D=-5; A=0.9;
[t,y]=ode45(@(t,y) mufangchengg(t,y,Cm , Cg,    Ss, Sf, F, Pg, Cr, Cw, Ct, Cor, Pf, Q,
Cp, dtC, Cf, Lr, La, afPa, Bs, bt, T, Tp, D, A),[0 10],[0.5 0.5 0.5 0.5]);
plot(t,y(:,1),'h-',t,y(:,2),'s-',t,y(:,3),'v-',t,y(:,4),'p-','linewidth',3,'markersize',2,'MarkerIn
dices',1:9:length(t));
hold on;
grid on;
ax = gca;
ax.FontSize = 20;
```

```
xlabel('$t$','interpreter','latex','Rotation',0,'FontSize',35);

ylabel('$p$','interpreter','latex','FontSize',35);

set(gca,'XTick',[0:0.2:1],'YTick',[0:0.2:1],'ZTick',[0:0.2:1]);

axis([0 1 0 1 0 1]);

legend('T=0.3 bt=37 A=0.3 ,w','T=0.3 bt=37 A=0.3,x','T=0.3 bt=37 A=0.3,y','T=0.3

bt=37 A=0.3,z','T=0.5 bt=75 A=0.6,w','T=0.5 bt=75 A=0.6,x','T=0.5 bt=75

A=0.6,y','T=0.5 bt=75 A=0.6,z','T=0.7 bt=150 A=0.9,w','T=0.7 bt=150

A=0.9,x','T=0.7 bt=150 A=0.9,y','T=0.7 bt=150 A=0.9,z','FontSize',25);
```