1)

function z = odesystem\_test(t,u)

a=.7;

b=.8;

c=3;

z1= c.\*(u(1)-((u(1)^3)./3)-u(2));

z2=(1/c).\*(u(1)+a-b.\*u(2));

z=[z1;z2];

tvec=[0 100];

u=zeros(2,1);

u(1)=.5;

u(2)=.5;

[t,u]=ode45('odesystem\_test',tvec,u);

figure(1)

plot(t,u(:,1))

xlabel('time')

ylabel('x')

Chart

Description automatically generated

figure(2)

plot(t, u(:,2))

xlabel('time')

ylabel('y')

Graphical user interface, chart

Description automatically generated

figure(3)

plot(u(:,1),u(:,2))

xlabel('x')

ylabel('y')

hold

x=linspace(-2,2);

plot(x,1.249.\*x + .8749)

plot(x,x-(x.^3).\*(1/3))

Chart

Description automatically generated

Chart, line chart

Description automatically generated

function z = odesystem\_test(t,u)

a=.7;

b=.8;

c=10;

z1= c.\*(u(1)-((u(1)^3)./3)-u(2));

z2=(1/c).\*(u(1)+a-b.\*u(2));

z=[z1;z2];

tvec=[0 100];

u=zeros(2,1);

u(1)=.5;

u(2)=.5;

[t,u]=ode45('odesystem\_test',tvec,u);

figure(1)

plot(t,u(:,1))

xlabel('time')

ylabel('x')

Chart, line chart

Description automatically generated

figure(2)

plot(t, u(:,2))

xlabel('time')

ylabel('y')

Graphical user interface, chart

Description automatically generated

figure(3)

plot(u(:,1),u(:,2))

xlabel('x')

ylabel('y')

hold

x=linspace(-2,2);

plot(x,1.249.\*x + .8749)

plot(x,x-(x.^3).\*(1/3))

Chart

Description automatically generated

Chart, line chart

Description automatically generated

2)

function z = odesystem\_test(t,u)

a=.7;

b=.8;

c=3;

z1= c.\*(u(1)-((u(1)^3)./3)-u(2));

z2=(1/c).\*(u(1)+a-b.\*u(2));

z=[z1;z2];

tvec=[0 100];

u=zeros(2,1);

u(1)=-1;

u(2)=-1;

[t,u]=ode45('odesystem\_test',tvec,u);

figure(3)

plot(u(:,1),u(:,2))

xlabel('x')

ylabel('y')

>> hold

x=linspace(-2,2);

plot(x,1.249.\*x + .8749)

plot(x,x-(x.^3).\*(1/3))

Chart, line chart

Description automatically generated

tvec=[0 100];

u=zeros(2,1);

u(1)=-1;

u(2)=-.5;

[t,u]=ode45('odesystem\_test',tvec,u);

figure(3)

plot(u(:,1),u(:,2))

xlabel('x')

ylabel('y')

>> hold

x=linspace(-2,2);

plot(x,1.249.\*x + .8749)

plot(x,x-(x.^3).\*(1/3))

Chart, line chart

Description automatically generated

3)

function z = odesystem\_test(t,u)

a=0;

b=.8;

c=3;

z1= c.\*(u(1)-((u(1)^3)./3)-u(2));

z2=(1/c).\*(u(1)+a-b.\*u(2));

z=[z1;z2];

tvec=[0 100];

u=zeros(2,1);

u(1)=.5;

u(2)=.5;

[t,u]=ode45('odesystem\_test',tvec,u);

figure(3)

plot(u(:,1),u(:,2))

xlabel('x')

ylabel('y')

>> hold

x=linspace(-2,2);

plot(x,1.249.\*x)

plot(x,x-(x.^3).\*(1/3))

Chart, line chart

Description automatically generated