**Problem 6:**

r=linspace(0,2.5,1000);

Array=[0,0.1,0.2,0.3,0.5,1];

for i=1:6

t=Array(1,i);

a=sqrt((1-r.^2).^2+(2.\*t.\*r).^2);

A=1./a;

plot(r,A,'LineWidth',1.5);

hold on;

end

set(gca,'ylim',[0,5]);

title('Amplitude','FontSize',18.0);

xlabel('Frequency Ratio $r=\frac{f}{{{f}\_{n}}}$',...

'Interpreter','latex','FontSize',15.0 );

ylabel('Amplification Ratio $$$$$X\frac{k}{{{F}\_{0}}}$',...

'Interpreter','latex','FontSize',15.0);

legend('$$\zeta =0$$ No damping','$\zeta =0.1$','$\zeta =0.2$',...

'$\zeta =0.3$','$\zeta =0.5$','$\zeta =1.0 Critical damping$', ...

'Interpreter','latex','FontSize',11);

grid on;

**Code（Amplitude）**

****

**Printed results**

Array=[0,0.1,0.2,0.3,0.5,1.0];

r=linspace(0,2.5,1000);

A=zeros(size(r));

for i=1:6

t=Array(1,i);

for j = 1:length(r)

if(r(j) < 1)

A(j)=atand((2\*t\*r(j))/(1-r(j)^2));

else

A(j)=atand((2\*t\*r(j))/(1-r(j)^2))+180;

end

end

plot(r,A,'LineWidth',1.5);

hold on;

end

set(gca,'ylim',[0,180]);

title('Phase','FontSize',18.0);

xlabel('Frequency Ratio $r=\frac{f}{{{f}\_{n}}}$',...

'Interpreter','latex','FontSize',15.0 );

ylabel('Phase Angle(deg) $\phi $',...

'Interpreter','latex','FontSize',15.0 );

legend('$$\zeta =0$$ No damping','$\zeta =0.1$','$\zeta =0.2$',...

'$\zeta =0.3$','$\zeta =0.5$','$\zeta =1.0 Critical damping$', ...

'Interpreter','latex','FontSize',11);

grid on;

**Code (Phase)**

****

**Problem 7:**

dsolve("m\*D2y+m\*g\*f+k\*y=0",'y(0)=0,Dy(0)=0','x')

ans =

(f\*g\*m\*exp((x\*(-k\*m)^(1/2))/m))/(2\*k) - (f\*g\*m)/k + (f\*g\*m\*exp(-(x\*(-k\*m)^(1/2))/m))/(2\*k)（t>0时的解）

dsolve("m\*D2y-m\*g\*f+k\*y=0",'y(0)=0,Dy(0)=0','x')

ans =

(f\*g\*m)/k - (f\*g\*m\*exp((x\*(-k\*m)^(1/2))/m))/(2\*k) - (f\*g\*m\*exp(-(x\*(-k\*m)^(1/2))/m))/(2\*k) （t<0时的解）

**Problem 11:**

clc;clear;

t=linspace(0,10,1000);

A=100/(12\*sqrt(399)\*1i).\*((exp((-1+1i\*sqrt(399)).\*t)-1)/...

(-1+1i\*sqrt(399))-(exp((-1-1i\*sqrt(399)).\*t)-1)/(-1-1i\*sqrt(399)))-...

(100.\*exp(-t)./(12\*sqrt(399)\*1i).\*((exp((1i\*sqrt(399)).\*t)-1)/...

(1i\*sqrt(399))-(exp((-1i\*sqrt(399)).\*t)-1)/(-1i\*sqrt(399))));

plot(A);

hold on;

B=100/(12\*sqrt(399)\*1i).\*((exp((-1+1i\*sqrt(399)).\*t)-1)/...

(-1+1i\*sqrt(399))-(exp((-1-1i\*sqrt(399)).\*t)-1)/(-1-1i\*sqrt(399)));

plot(B);

ylabel('$x(t)$','Interpreter','latex','FontSize',15.0 );

xlabel('$t$','Interpreter','latex','FontSize',15.0);

legend('$F(t)=200(1-{{e}^{-t}})$','$F(t)=200$',...

'Interpreter','latex','FontSize',11);

****