
```
%QUESTION 1A
clear
clc
close all
[m1,m2,m3,m4,m5]=deal(10);
[k1,k2,k3,k4,k5,k6]=deal(1);
K = [k1+k2 -k2 0 0 0;
     -k2, k2+k3, -k3 0 0;
     0 -k3 k3+k4 -k4 0;
     0 0 -k4, k4+k5, -k5;
     0 0 0 -k5, k4+k5];
M = [m1 0 0 0 0;
     0 m2 0 0 0;
     0 0 m3 0 0;
     0 0 0 m4 0;
     0 0 0 0 m5];
[abb,lambda]=eig(K,M);
Wn=sqrt(diag(lambda));
fprintf('Eigen Values is \n');
disp(lambda);
fprintf('Natural Frequeniy is \n');
disp(Wn);
A = -inv(M)*K;
PHI = A^(1/2);
[U,L] = eig(PHI);
u1 = U(:,1);
u2 = U(:,2);
u3 = U(:,2);
u4 = U(:,2);
u5 = U(:,2);
l1 = L(1,1);
l2 = L(2,2);
l3 = L(3,3);
l4 = L(4,4);
l5 = L(5,5);

tout = linspace(0,20,1000);

model1 = exp(l1*tout);
mode2 = exp(l2*tout);
mode3 = exp(l3*tout);
mode4 = exp(l4*tout);
mode5 = exp(l5*tout);

figure(1)
plot(tout,model1,'m')
hold on
plot(tout,mode2,'r-')
hold on
plot(tout,mode3,'g-')
hold on
plot(tout,mode4,'c-')
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hold on
plot(tout,mode5,'b-')
legend({'mode1','mode2','mode3','mode4','mode5'},"AutoUpdate","on",NumColumns=2 )
xlabel('real')
ylabel('imag')
zlabel('t')
%%3D plot with real and imaginary
figure(2)
plot3(real(mode1),imag(mode1),tout, 'm')
hold on
plot3(real(mode2),imag(mode2),tout,'r-')
hold on
plot3(real(mode3),imag(mode3),tout,'g-')
hold on
plot3(real(mode4),imag(mode4),tout,'c-')
hold on
plot3(real(mode5),imag(mode5),tout,'b-')
legend({'mode1','mode2','mode3','mode4','mode5'},"AutoUpdate","on",NumColumns=2 )
xlabel('real')
ylabel('imag')
zlabel('t')

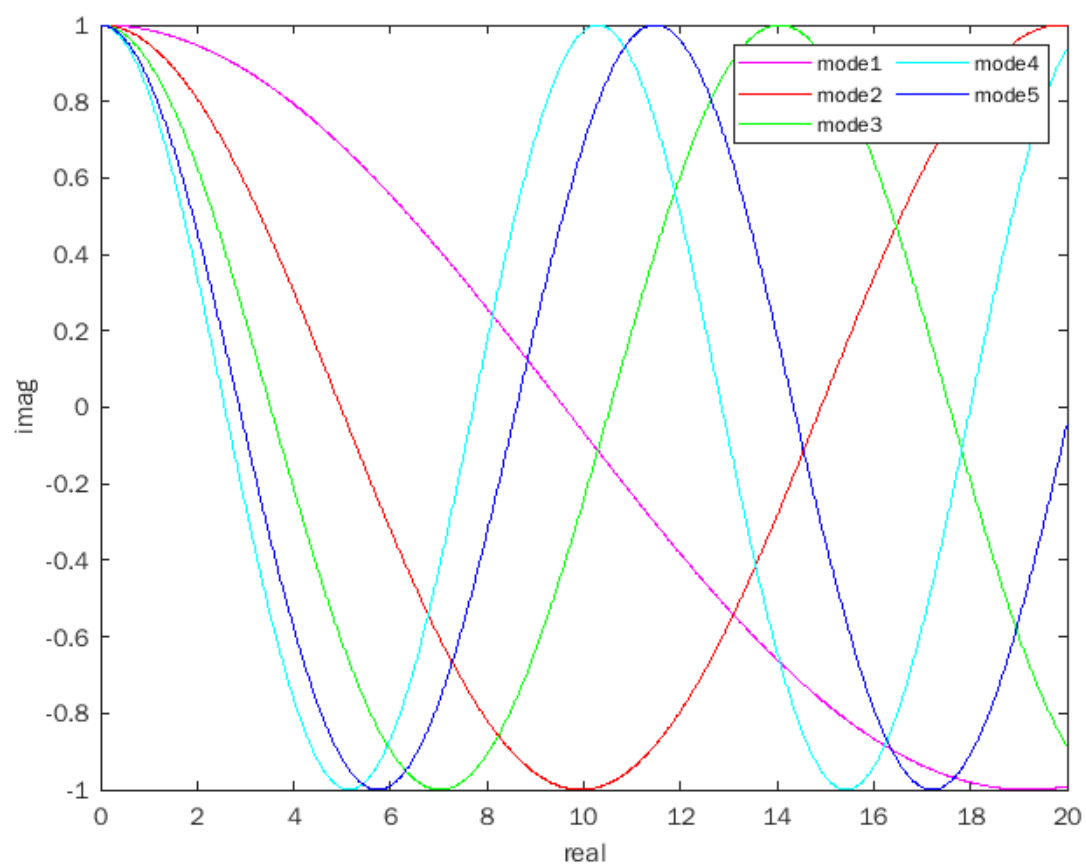
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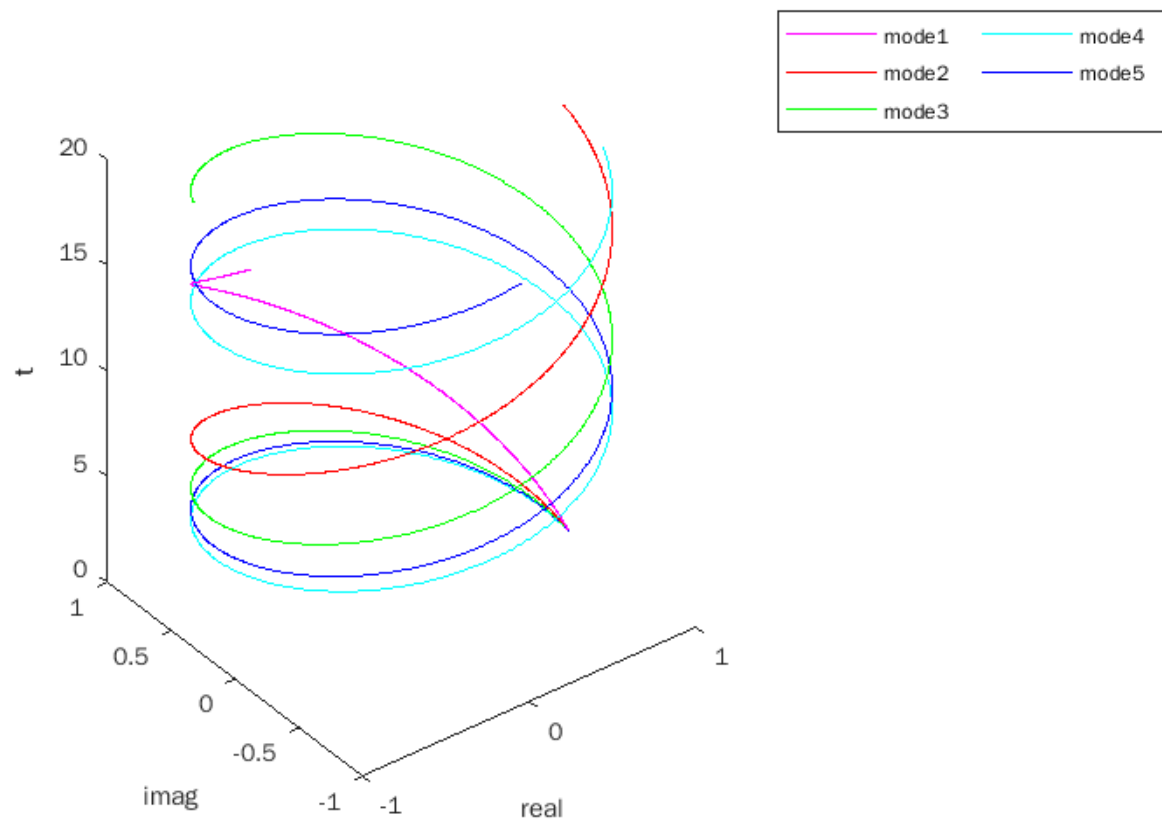
Eigne Values is

0.0268	0	0	0	0
0	0.1000	0	0	0
0	0	0.2000	0	0
0	0	0	0.3000	0
0	0	0	0	0.3732

Natural Frequeny is

0.1637
 0.3162
 0.4472
 0.5477
 0.6109





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