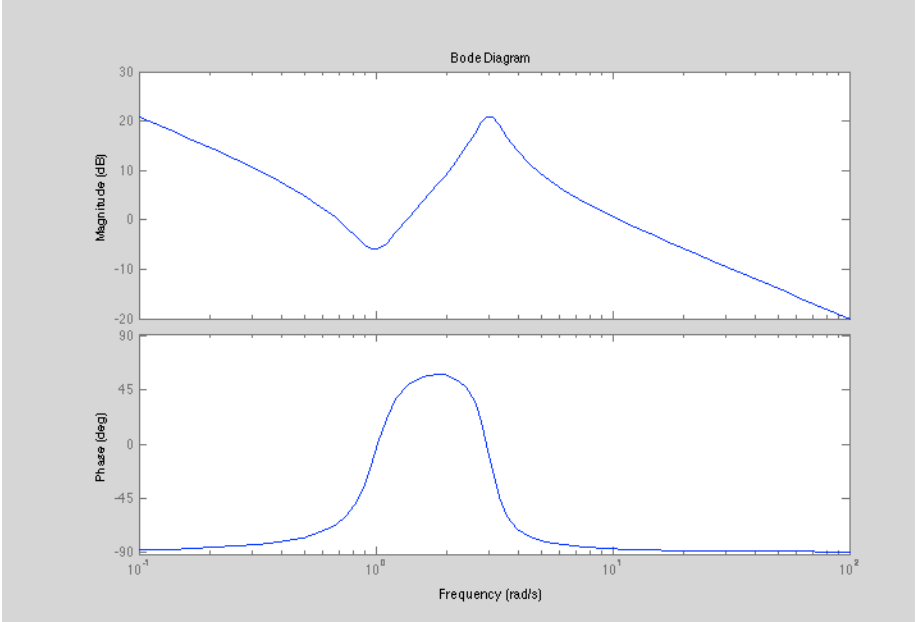
**Jaime Rodriguez**
**ECE 311 Feedback & Control**
**HW #6, 5-17-2015**

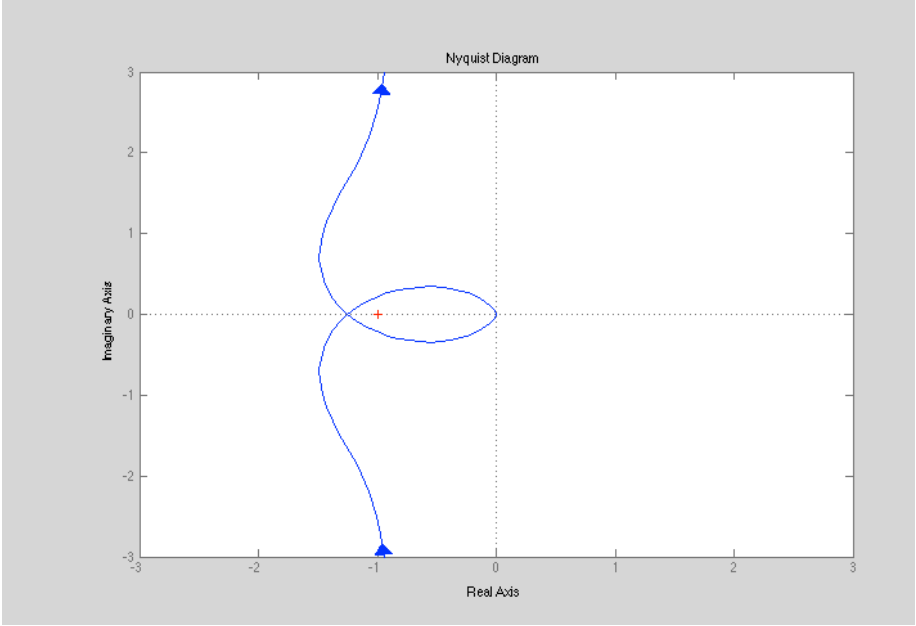
**7-4)**

```
s=tf('s');
g=(10*(s^2+.4*s+1))/
  (s*(s^2+.8*s+9));
bode(g);
```




**7-12)**

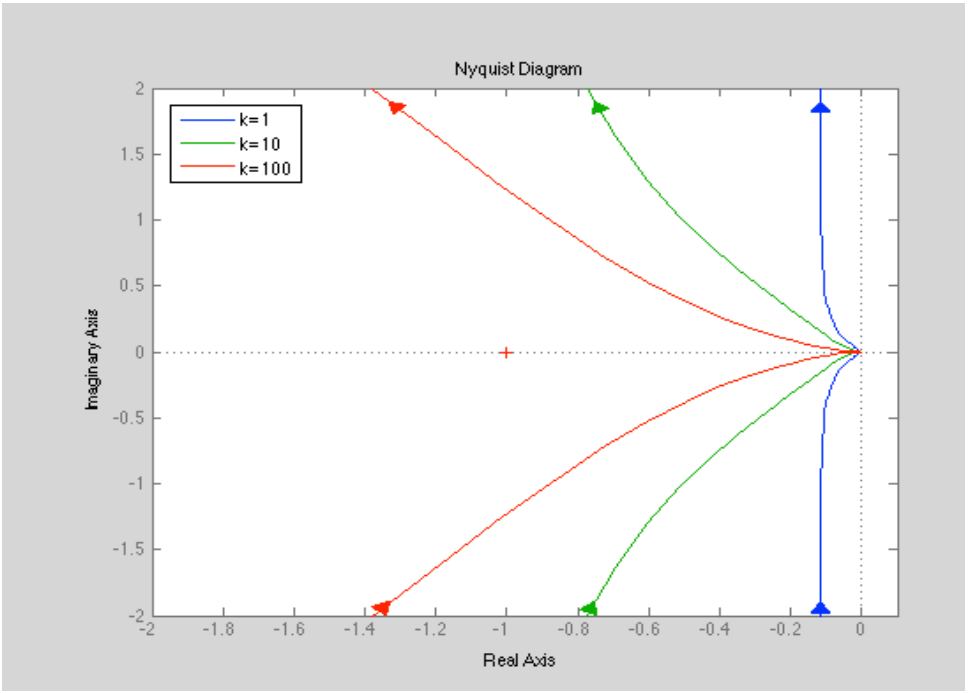
```
clc
clear
s=tf('s');
g=  1 / (s*(s^2+.8*s+1));
nyquist(g);
xlim ([-3,3]);
ylim ([-3,3]);
```




**7-18)**

```
clc
clear
legend('k=1','k=10','k=100');
s=tf('s');
```

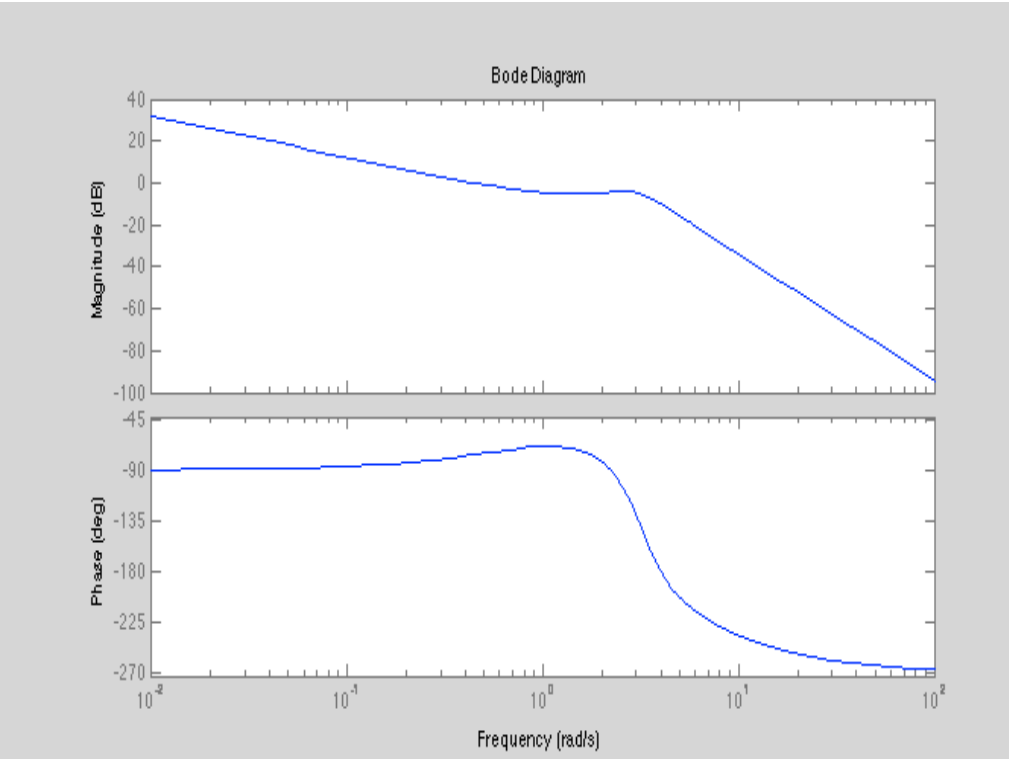
```
k=[1,10,100];
for n=1:1:3
g=  (k(n)*(s+2))
/(s*(s+1)*(s+10));
nyquist(g);
hold on
xlim ([-2,.1]);
ylim ([-2,2]);
end
```



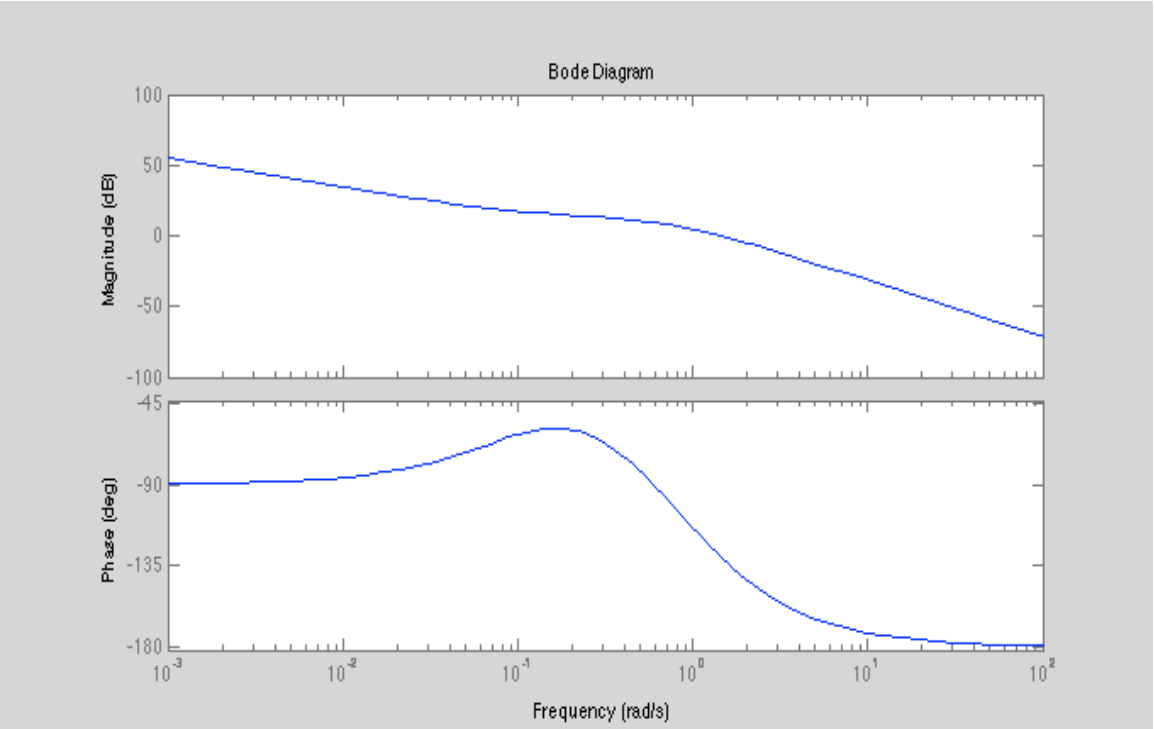

**7-25)**

```
clc
clear
s=tf('s');
g= (20*(s+1))/(s*(s^2+2*s+10)*(s+5));
bode(g);
[Gm,Pm,Wcg,Wcp] = margin(g)
Gmdb=20*log10(Gm)
```

```
Gmdb =
    9.9301 dB
Pm =
  103.6573
Wcg =
    4.0132
Wcp =
    0.4426
```



**7-28)**



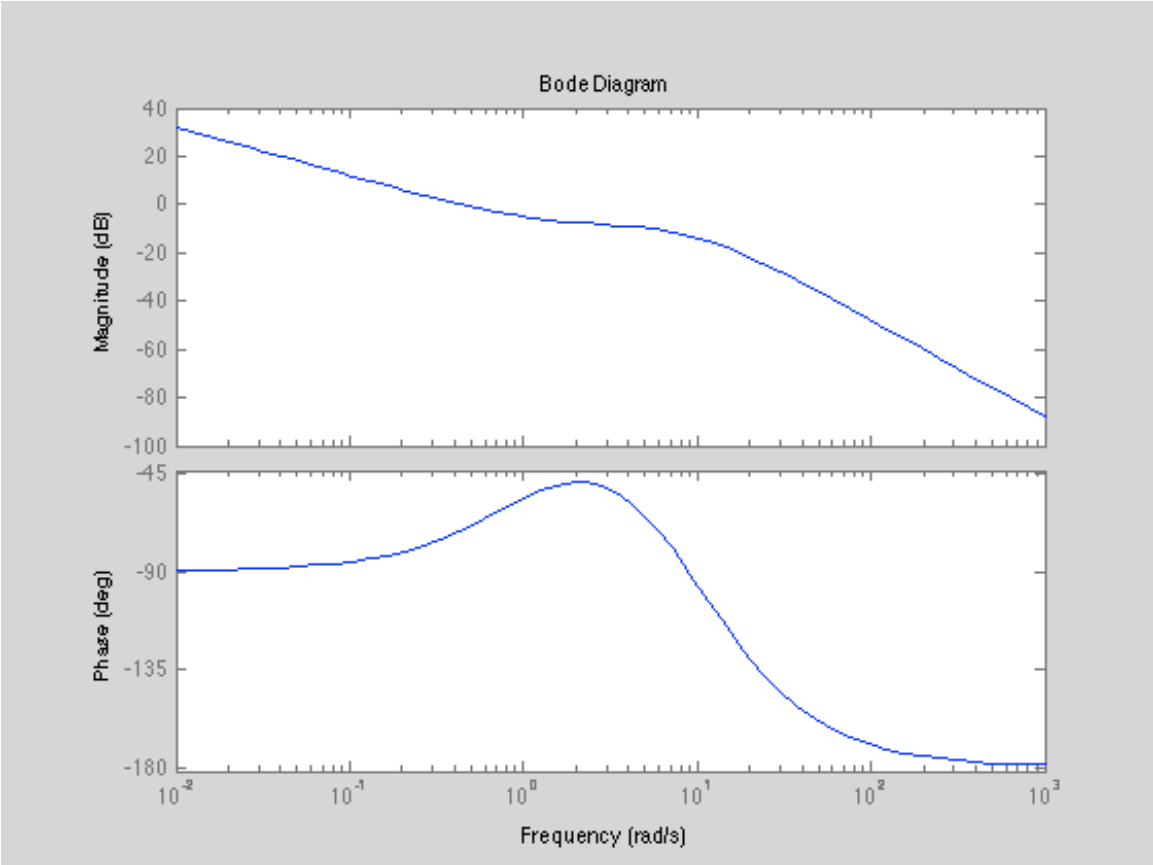

```
clc
clear
s=tf('s');

k=.266;

g=  (10*k*(s+.1)) / (s*(s+1)*(s+.5));
bode(g);
[Gm,Pm,Wcg,Wcp] = margin(g)
Gmdb=20*log10(Gm)
```

Gmdb =
  Inf
Pm =
  50.0118
Wcg =
  Inf
Wcp =
  1.4379

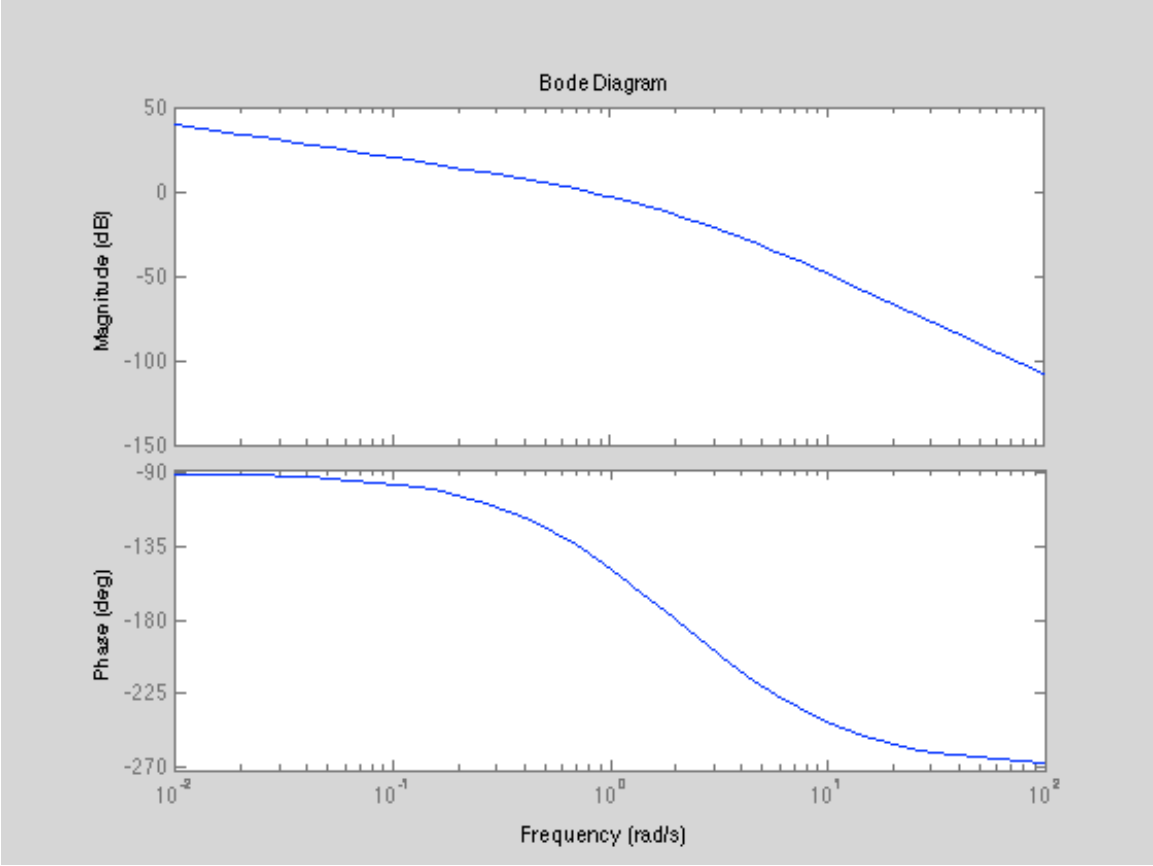
K =.266 , value was found by varying k until Phase margin was 50

## Problem #1

```
clc
clear
s=tf('s');
g=  (39.8*(s+1))/(s*(s+10)^2);
bode(g);
```



**Problem#2**

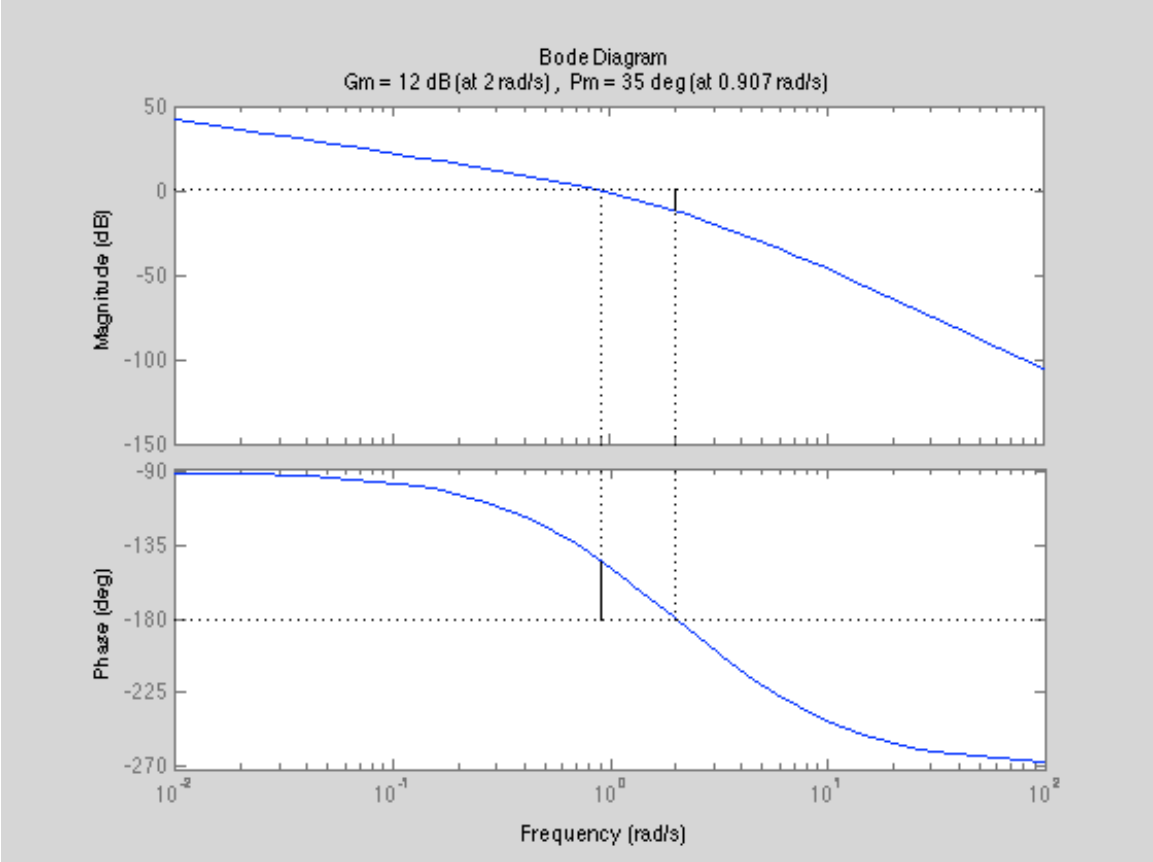



```
clc
clear
s=tf('s');
l=4/(s*(s+1)*(s+4));
bode(l)
[Gm,Pm,Wcg,Wcp] = margin(l)
Gmdb=20*log10(Gm)
```

**b)**

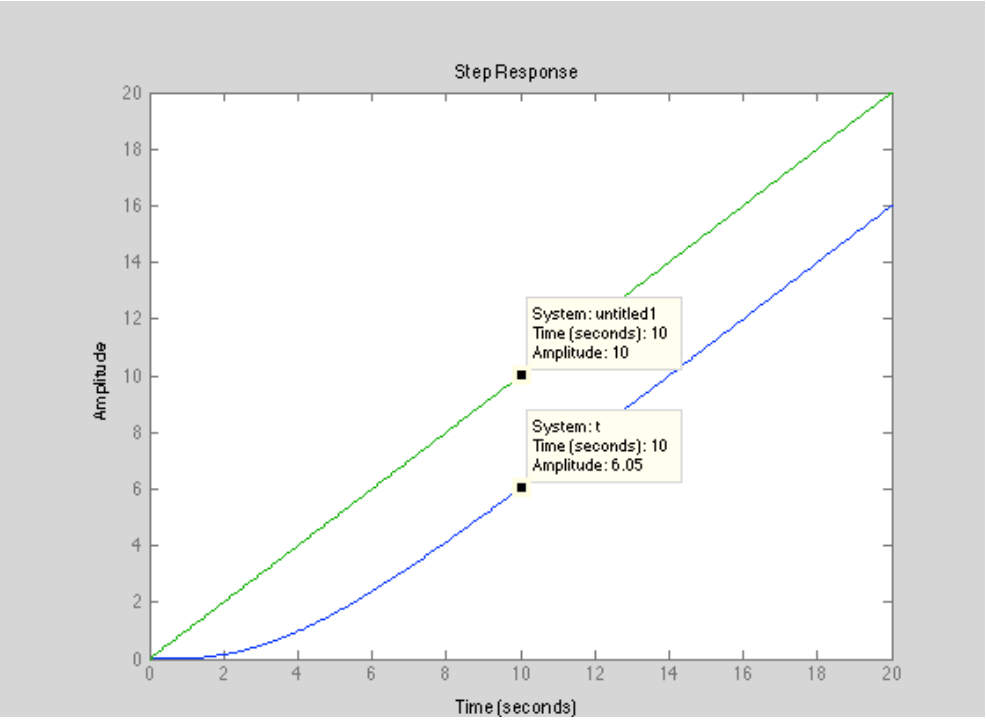
**Gmdb = 13.9794**
**Pm = 41.2246**

**c)**
**K=5**
**Gmdb =12.0065**




**d)**

**K needs to be 1 to give a 25% ess**



**e)**

**Stable no sign change in the Routh array**

**f)**