Assignment 10

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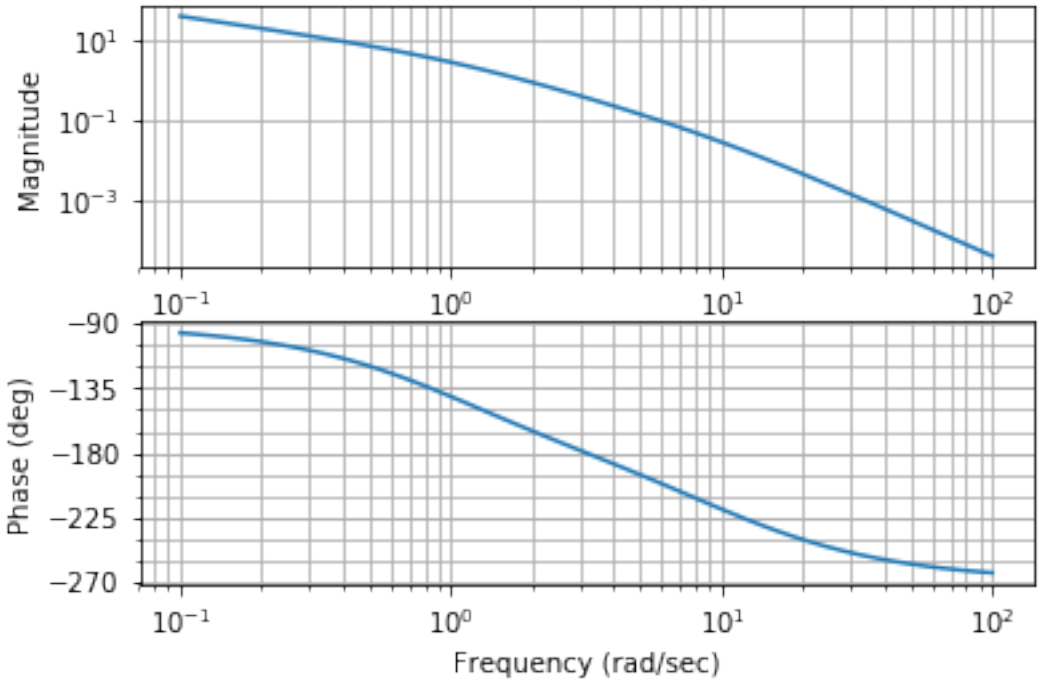
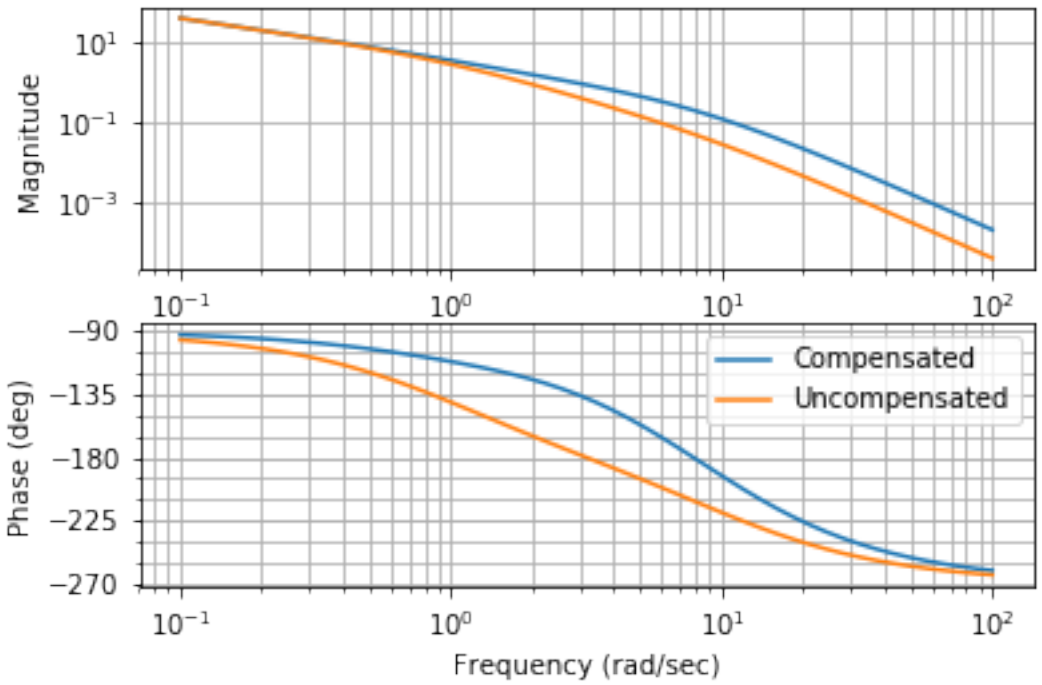
1 Question 8

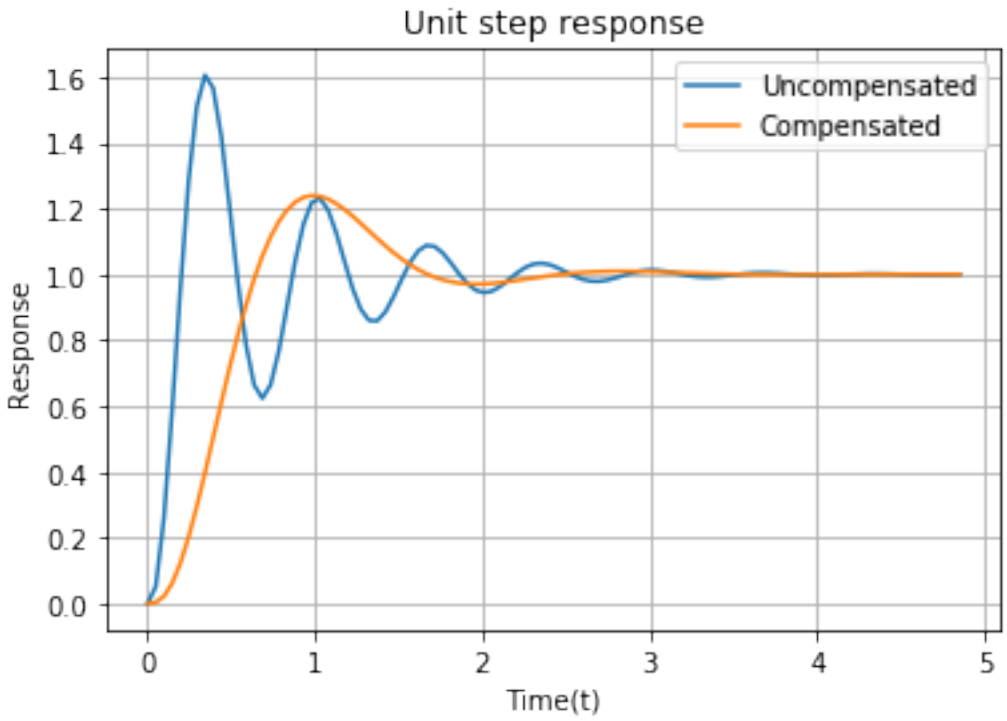
```
Gain Margin:  8.78665387661
Phase Margin:  17.7050408744
Phase Crossover Frequency:  3.16227766017
Gain Crossover Frequency:  1.86121634596
```

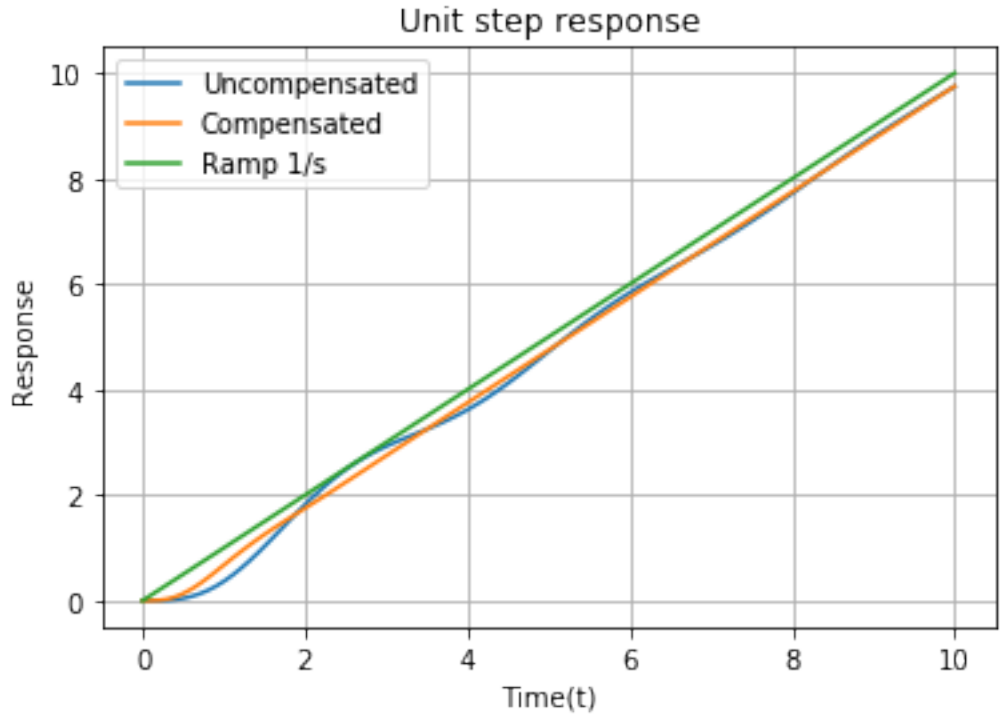




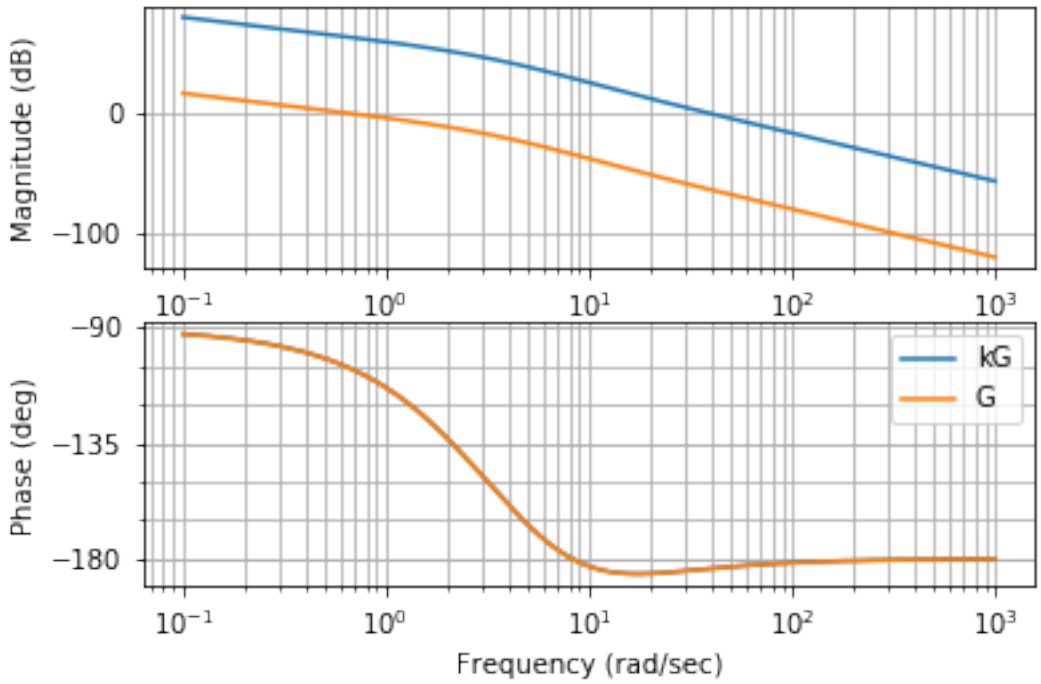

```
Gain Margin:  13.9826379276
Phase Margin:  45.9994413842
Phase Crossover Frequency:  7.85540347906
Gain Crossover Frequency:  2.82394229343


Settling Time is 2.205857
Percentage Overshoot is 23.972688
Steady State error: 0.250000063217
Kv: 3.99999898853
```


Unit step response
Uncompensated
Compensated
Response
Time(t)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
0
1
2
3
4
5


Unit step response
Uncompensated
Compensated
Ramp 1/s
Response
Time(t)
0
2
4
6
8
10

2 Question 10




```
Gain Margin:  -29.3904918146
Phase Margin:  -3.99734470515
Phase Crossover Frequency:  8.20264304811
Gain Crossover Frequency:  38.9482530177


Desired Phase Margin:53.17183381591314


Alpha: 0.1954948220434724
omega_gc: 2.9470517025518097
phi_m:42.294959125557
magnitude(20log(1/sqrt(alpha))):791.0750069350659
Compensator
8.607 s + 1
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6808 s + 1
```
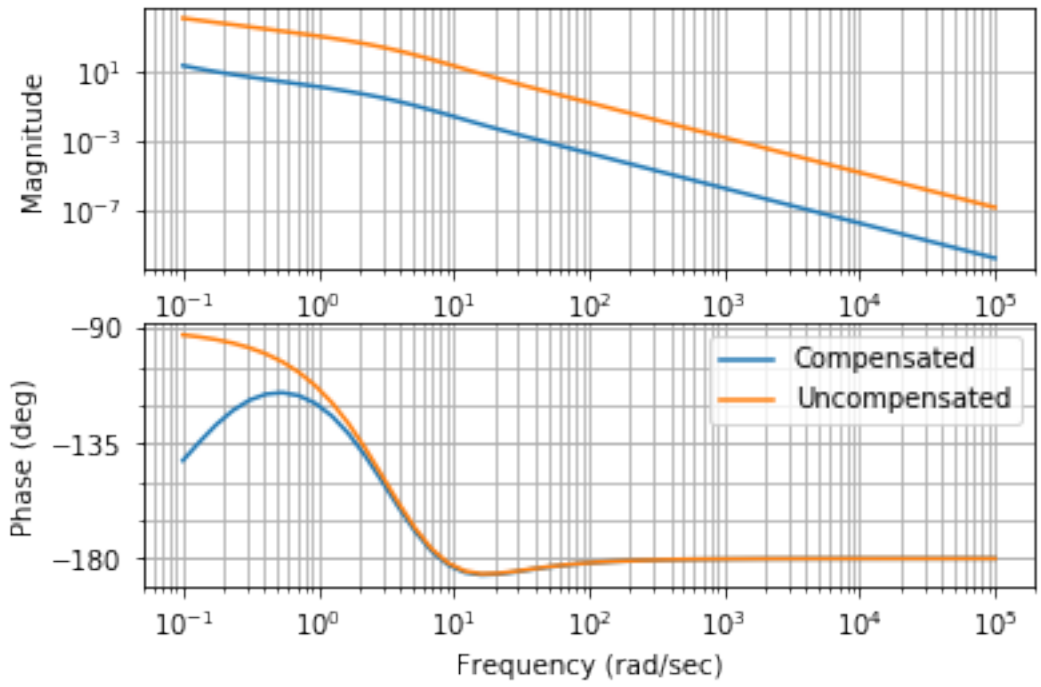
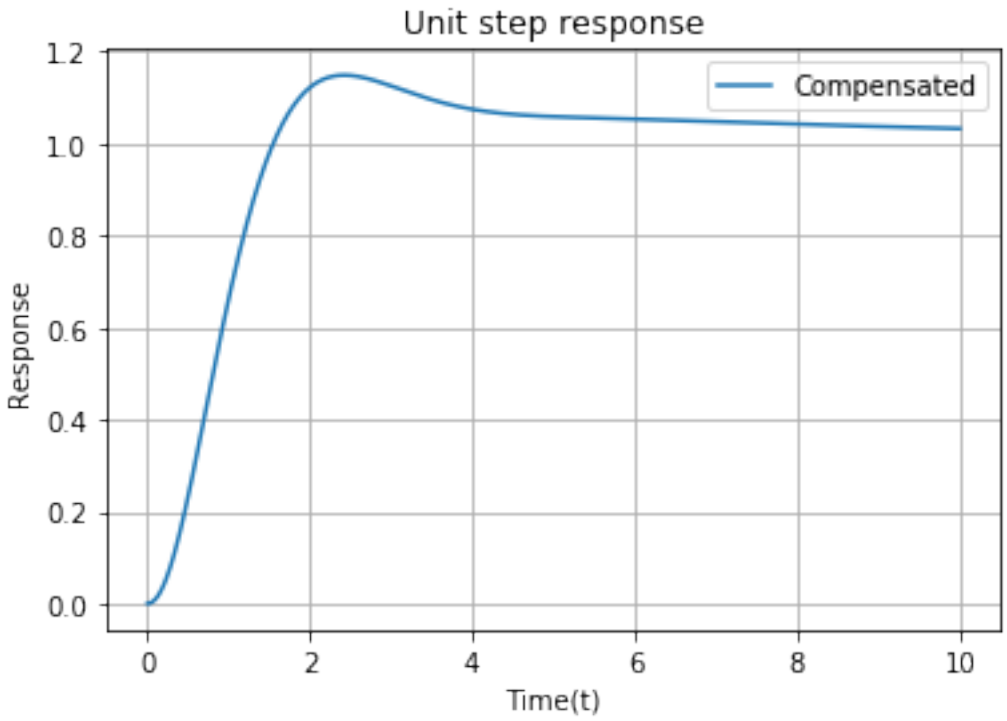
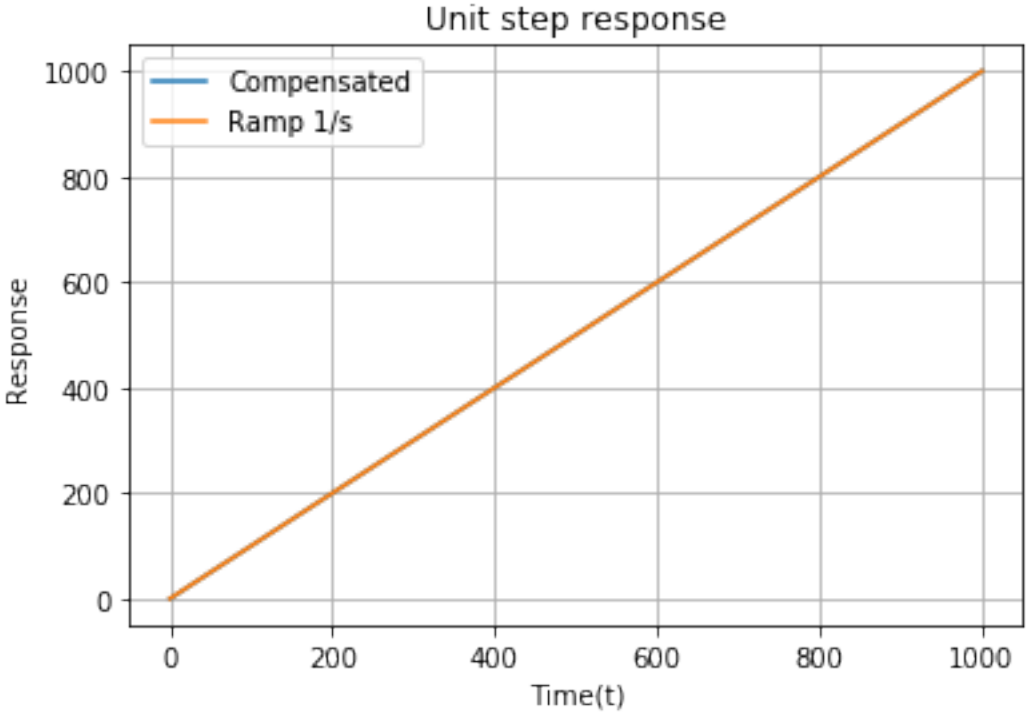




```
Gain Margin:  27.7338640319
Phase Margin:  57.3851242774
Phase Crossover Frequency:  7.85377747572
Gain Crossover Frequency:  1.16686024728
```

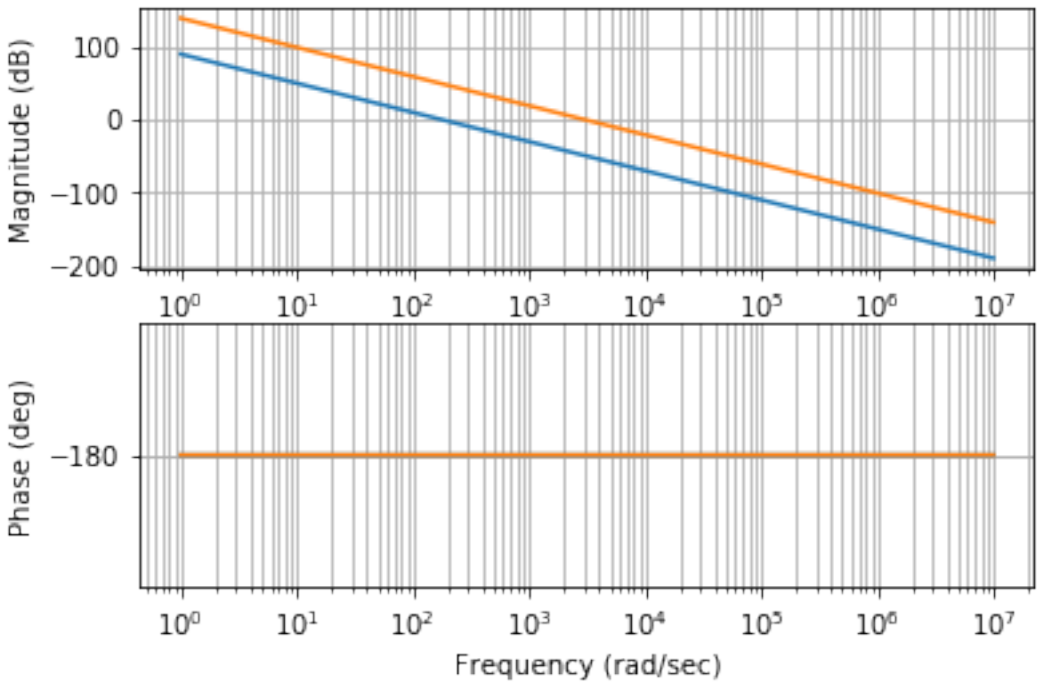



```
Percentage Overshoot is 14.885291
Kv: 999.998452521
```



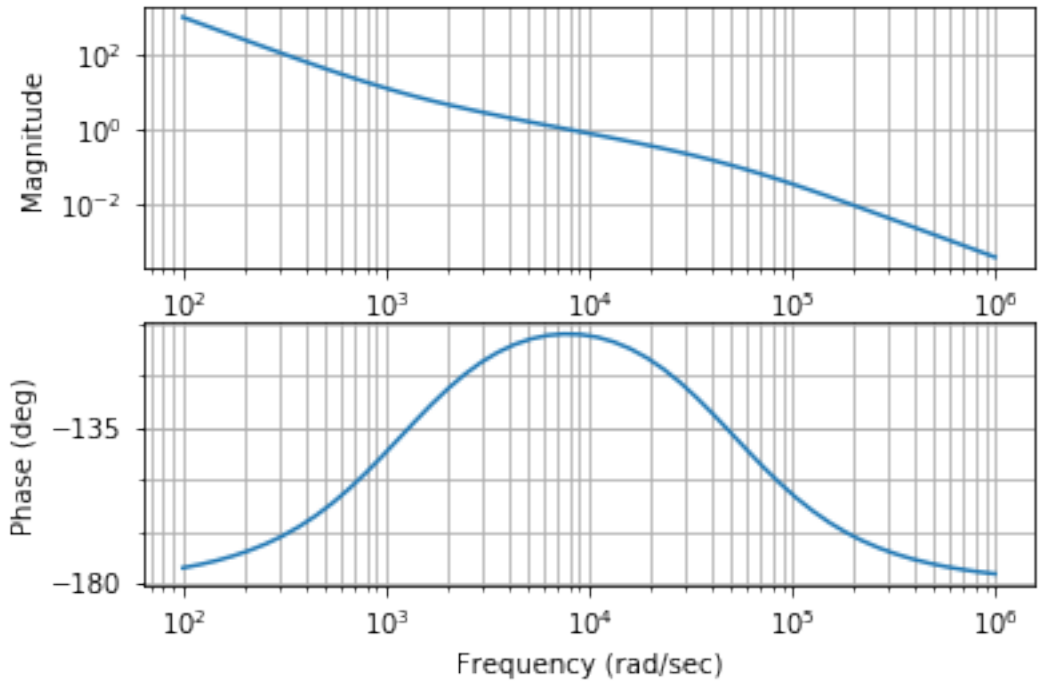
3 Question 12

```
Desired Phase Margin:52.137944485003494
Desired gain crossover frequency:3109.6628215357177


Gain Margin:  inf
Phase Margin:  0.0
Phase Crossover Frequency:  nan
Gain Crossover Frequency:  182.574185835
G(s):
1e+05
-----
3 s^2
```

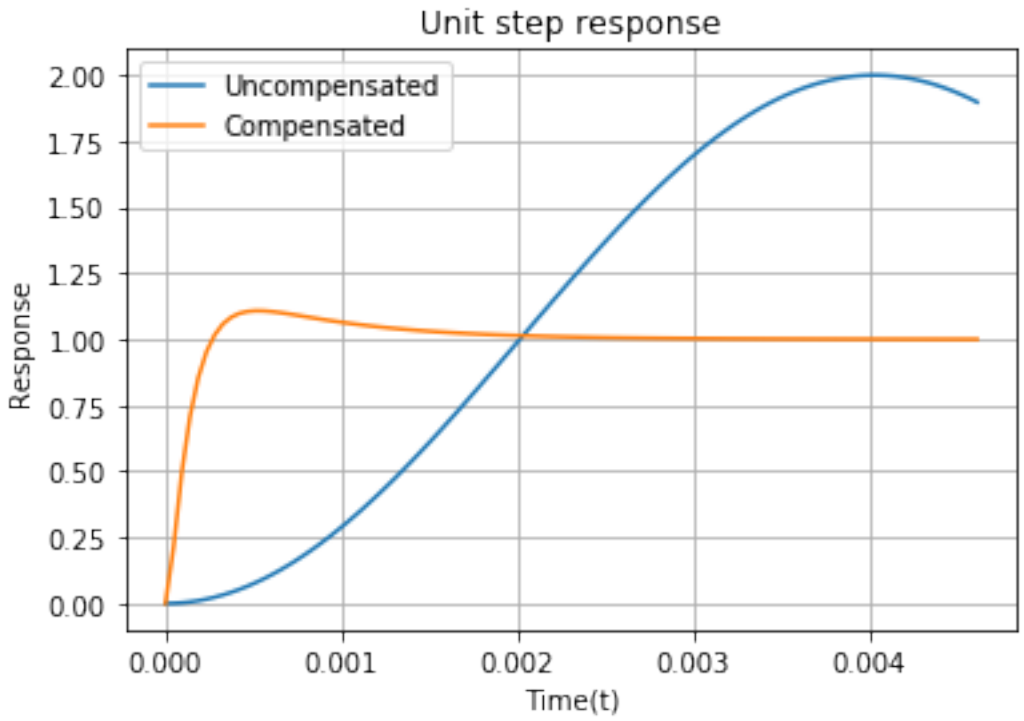



```
Gain Margin:  inf
Phase Margin:  0.0
Phase Crossover Frequency:  nan
Gain Crossover Frequency:  3109.66282154
```

```
G(s):
2.901e+07
---------
  3 s^2

Magnitude 20log(1/sqrt(alpha)) in dB: 16.073674468911257
Magnitude 0.15715068433487242


Frequency where gain is to be added: 7844.38581337
```

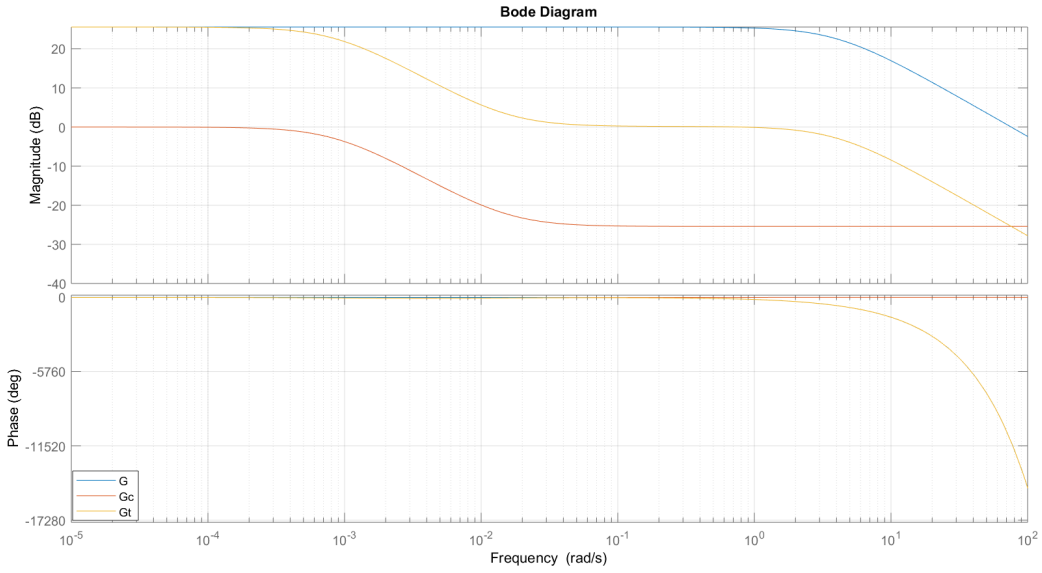


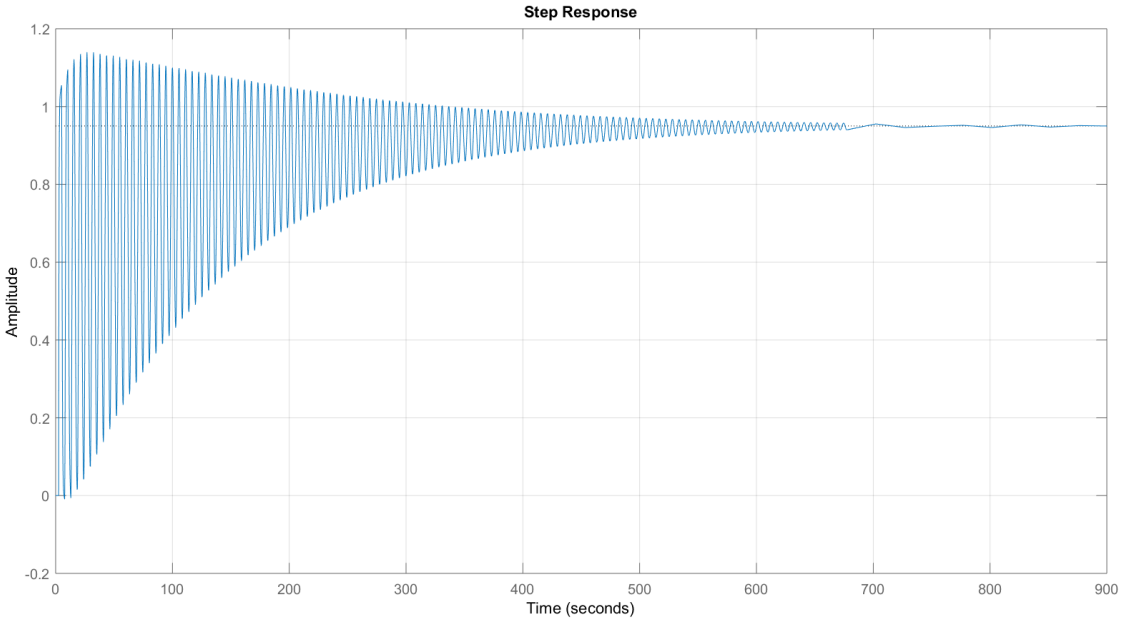

```
Gain Margin:  inf
Phase Margin:  72.1379444827
Phase Crossover Frequency:  nan
Gain Crossover Frequency:  7844.25545553
Gc:
0.0008112 s + 1
---------------
2.003e-05 s + 1
```




```
Settling Time is 0.001817
Percentage Overshoot is 10.800067
```

4 Question 13




Step Response
Amplitude
Time (seconds)
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
0
100
200
300
400
500
600
700
800
900