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ME 415 : Feedback Control Theory

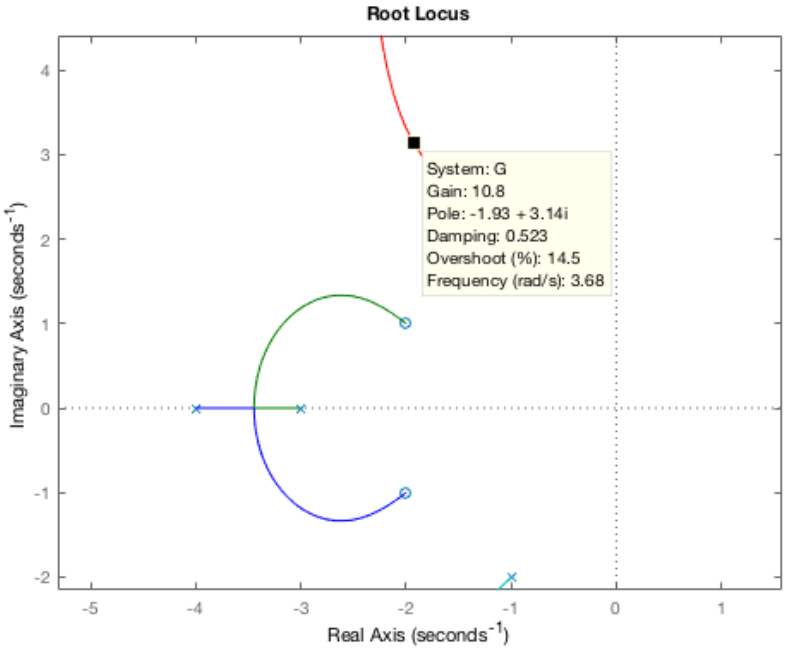
Dr. D. Justice - Fall 2018

Homework Assignment 8

2, 11, 23, 30, 34, 41, 64

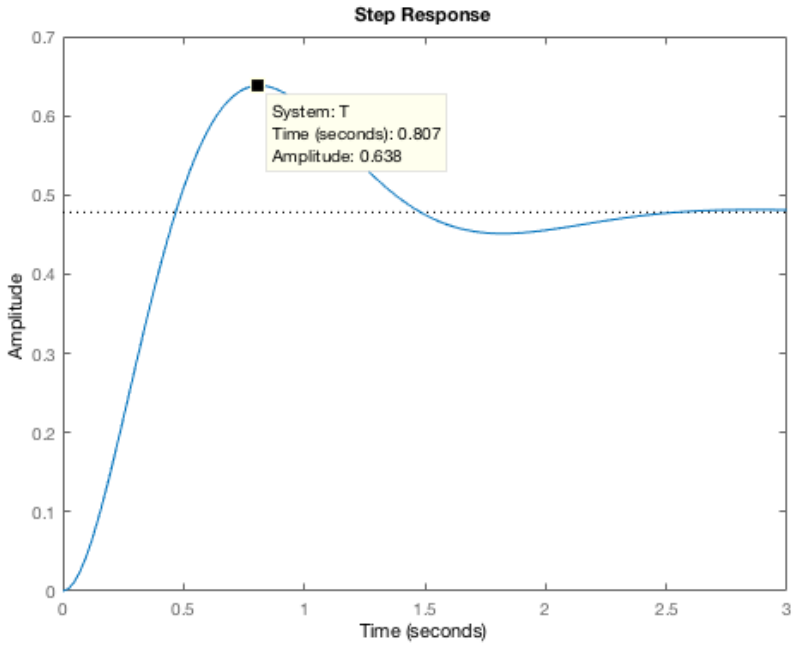
30 October 2018

Problem 34 a: Root locus at approx -2 $\pm$ jπ shows a gain of 10.8

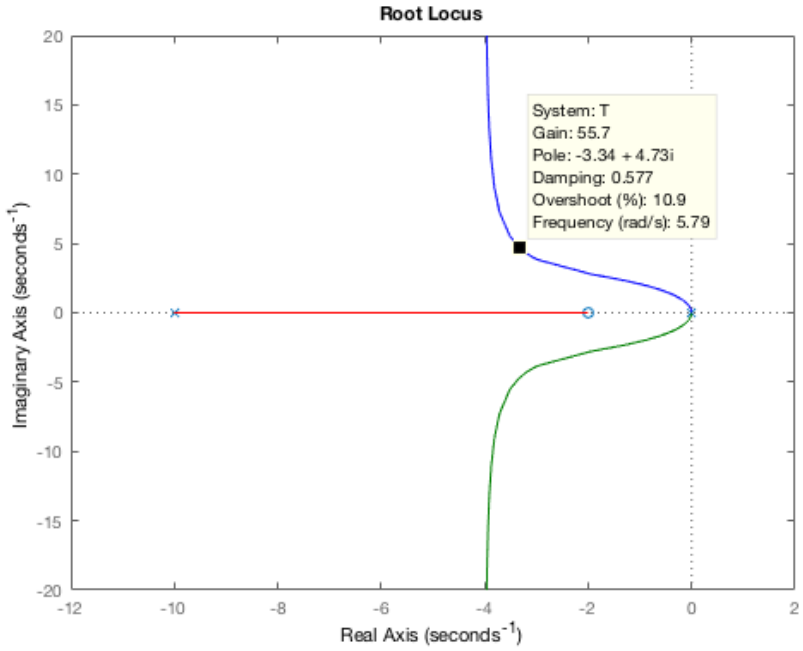



```
% numg = [1 4 5];
numg = 11 * [1 4 5];
deng = conv([1 2 5],
poly([-3 -4]));
G = tf(numg,deng);
T = feedback(G,1);
% rlocus(G)
% axis equal
step(T)
```

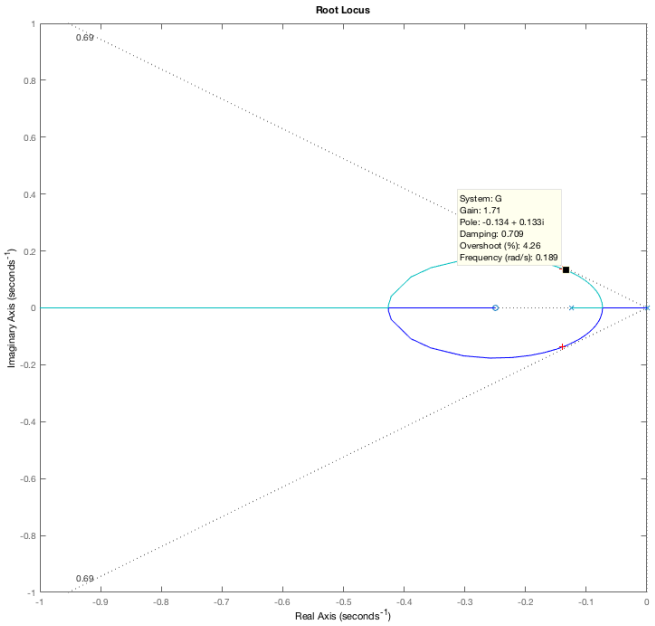
Problem 34 b: Step Response decreases from 1 second to 0.8 seconds



Problem 41


Root Locus
System: T
Gain: 55.7
Pole: -3.34 + 4.73i
Damping: 0.577
Overshoot (%): 10.9
Frequency (rad/s): 5.79
Imaginary Axis (seconds^{-1})
Real Axis (seconds^{-1})
20
15
10
5
0
-5
-10
-15
-20
-12
-10
-8
-6
-4
-2
0
2

Problem 64




```
J1 = 10;
B1 = 1;
k = 100;
Jm = 2;
Bm = 0.5;
os = 5;

p1 = [J1 B1 k];
pm = [Jm Bm k];

Gc = tf([1 0.25],1);
Gp = tf(1, pm)*tf(k,p1);

G = Gc*feedback(Gp, -k);
rlocus(G)
axis([-1 0 -1 1])
z = -log(os/100) / sqrt(pi^2 + log(os/100)^2);
sgrid(z,0);
kd = rlocfind(G);
```