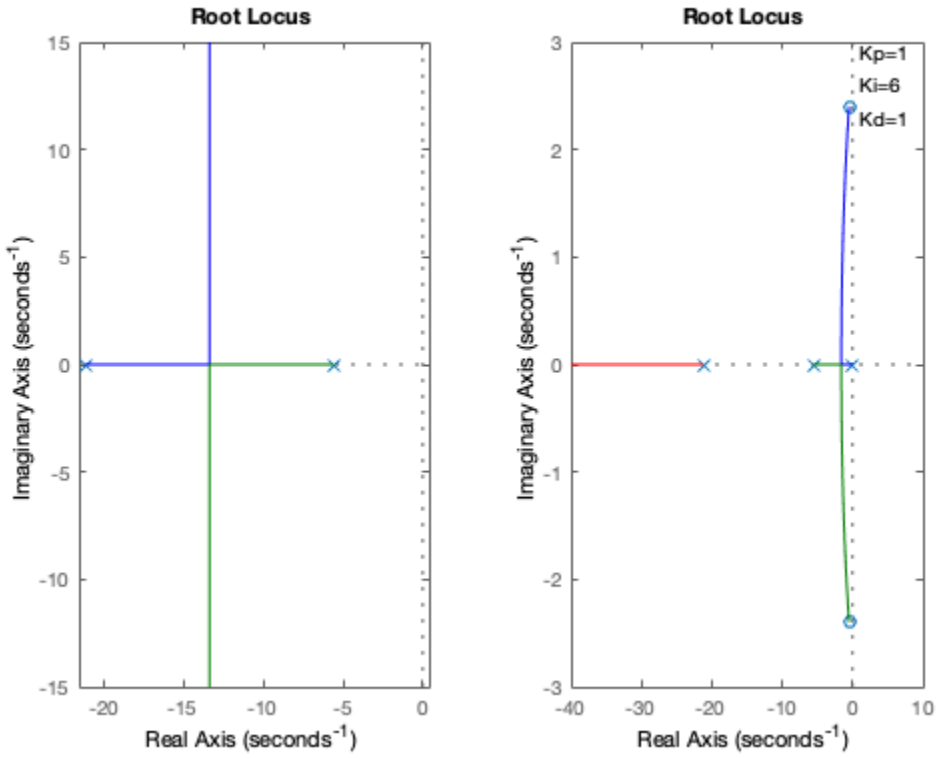
```
close all
syms s

%defining parameters of system
%you may change parameters as needed to
%simulate your control system
l2=114.15*10^-3;%m
l1=l2/2;
B=0.1;          %Nm*s/rad
m1=650*(10^-3); %kg
m2=70*(10^-3);  %kg
g=9.81;         %m/s^2

%calculating inertia of body by using parallel axis theorem
I=((1/12)*(m1*l2^2))+m1*(l1)^2;

%creating transfer function for original system
T=tf(1,[(m2*l2^2+I) B g*(m1*l1+m2*l2)])
subplot(1,2,1)
title('Original Root Locus')

%plotting root locus
rlocus(T)
hold on

%implementing PID control to original system
C=pid(1, 6 ,1);
G=C*T
subplot(1,2,2)
title('Modified Root Locus')
rlocus(G)
txt1 = strcat('Kp=',int2str(C.Kp))
txt2= strcat('Ki=',int2str(C.Ki))
txt3=strcat('Kd=',int2str(C.Kd))
text(1,2.9,txt1)
text(1,2.6,txt2)
text(1,2.3,txt3)

hold off
```

```
T =

                1
  ------------------------------
  0.003735 s^2 + 0.1 s + 0.4423

Continuous-time transfer function.


G =
```

```
            s^2 + s + 6
  --------------------------------
  0.003735 s^3 + 0.1 s^2 + 0.4423 s

Continuous-time transfer function.

txt1 =

    'Kp=1'

txt2 =

    'Ki=6'

txt3 =

    'Kd=1'
```



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