%% 13.a To examine the relationships between open-loop frequency response and stability and closed loop transient response

clc;

clear;

s = tf('s')

Open = (s+3)/(s+1)

Closed = feedback(Open,1)

figure(1)

margin(Open),grid

hold on

margin(Closed),grid

%% 13.b To study the effect poles and zeroes on the closed loop transient response

G = (s+3)/((s+1)\*(s+2))

F = feedback(G,1)

Fp = F/(s+4) %adding pole

Fz = F\*(s+4) %adding zero

figure(2)

step(Fp),grid

hold on

step(Fz),grid

%% 14.a Effect of adding poles and zeroes to open loop on root locus contour

R = (s+3)/((s+1)\*(s+2))

Rp = R/(s+4) %adding pole

Rz = R\*(s+4) %adding zero

figure(3)

rlocus(Rp),grid

hold on

rlocus(Rz),grid

%% 14.b To estimate the effect of open loop gain on the transient response of closed loop system by using Root locus

C = (s+3)/((s+1)\*(s+2))

Cc = feedback(C,1)

CcK = 10\*Cc

figure(4)

step(Cc),grid

hold on

step(CcK),grid

figure(5)

rlocus(CcK)

%% 14.c Comparative study of Bode, Nyquist and Root locus with respect to Stability

T = (s+3)/((s+1)\*(s+2))

Tc = feedback(T,1)

figure(6)

bode(Tc),grid

figure(7)

nyquist(Tc),grid

figure(8)

rlocus(Tc)