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4.1

```
clc
clear all
plotoptions= nyquistoptions('cstprefs') ;
plotoptions.ShowFullContour = 'off';

% a)
% LFR for Ha is in the 4th quadrant until the frequency 0.915
% HFR for Ha is in the 4th quadrant from 0.908 frequency going to the 3rd
quadrant
% the cutoff frequency for H1 is 1.52
% the bandwidth is between 0 and 1.52
% LPF
hold on
Ha = tf(2,[1 1 1]);
nyquist(Ha,plotoptions)

% b)
% LFR for H2 is in the 4th quadrant until the frequency 1.67
% HFR for H2 is in the 4th quadrant from 1.67 frequency going to the 1st
quadrant
% the cutoff frequency for H1 is 1.56 and 2.61
% the bandwidth is (0, 1.67) U (2.61, inf)
% SBF
Hb = tf([1 0 4],[0.3 1 1]);
figure
nyquist(Hb,plotoptions);

% c)
% LFR for H3 is in the 2nd and 1st quadrants until the frequency 3.08
% HFR for H3 is in the 1st quadrant from 3.08 frequency
% the cutoff frequency for H1 is 1.14
% the bandwidth is between 3.08 and infinity
% HPF
Hc = tf([1 0 0],[0.3 1 1]);
figure
nyquist(Hc,plotoptions);

% d)
% LFR for H4 is in the 1st quadrant until the frequency 1.83
% HFR for H4 is in the 4th quadrant from 1.83 frequency
% the cutoff frequency for H1 is 1.83
% bandwidth is 1.83
% BPF
```

```
Hd = tf([1 0],[0.3 1 1]);
figure
nyquist(Hd,plotoptions);
```

4.2

```
clc
clear all
plotoptions= nyquistoptions('cstprefs') ;
plotoptions.ShowFullContour = 'off';

t = 0:0.01:10;
Ha = tf(2,[1 1 1]);
u = 0.707 * sin(t);
y = lsim(Ha,u,t);
plot(t,y)
```

4.4

```
clc
clear all
H1 = tf(2,[4 1]);
H2 = tf(3,[4 1]);
H3 = tf(5,[4 1]);
hold on

plotoptions= nyquistoptions('cstprefs') ;
plotoptions.ShowFullContour = 'off';
nyquist(H1, H2, H3, plotoptions)

title('Nyquist Diagram');
legend('H(s) = 2/4*s+1', 'H(s) = 3/4*s+1', 'H(s) = 2/4*s+1')
axis([-1 5 -3.5 1]);
grid off
axis padded

H11 = tf(2,[10^-4 1]);
H12 = tf(2,[10^-3 1]);
H13 = tf(2,[10^-2 1]);
figure

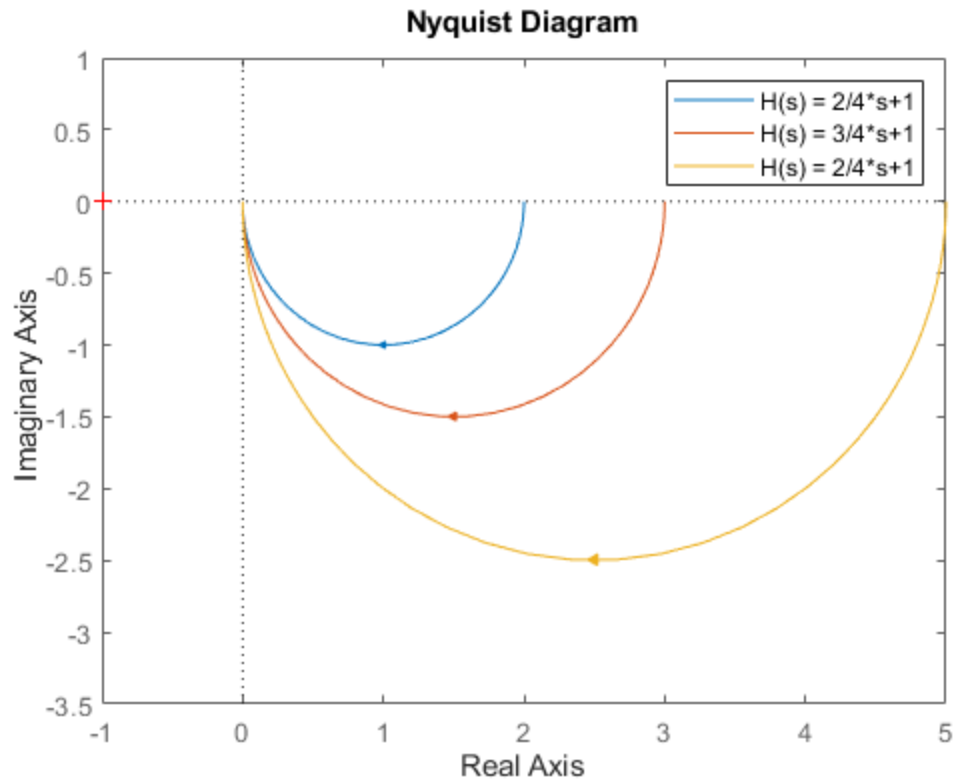
subplot(1,3,1)
nyquist(H11,plotoptions);
axis([-0.5 2.5 -1.2 0.4])
legend('H(s) = 2/10^-4*s+1')

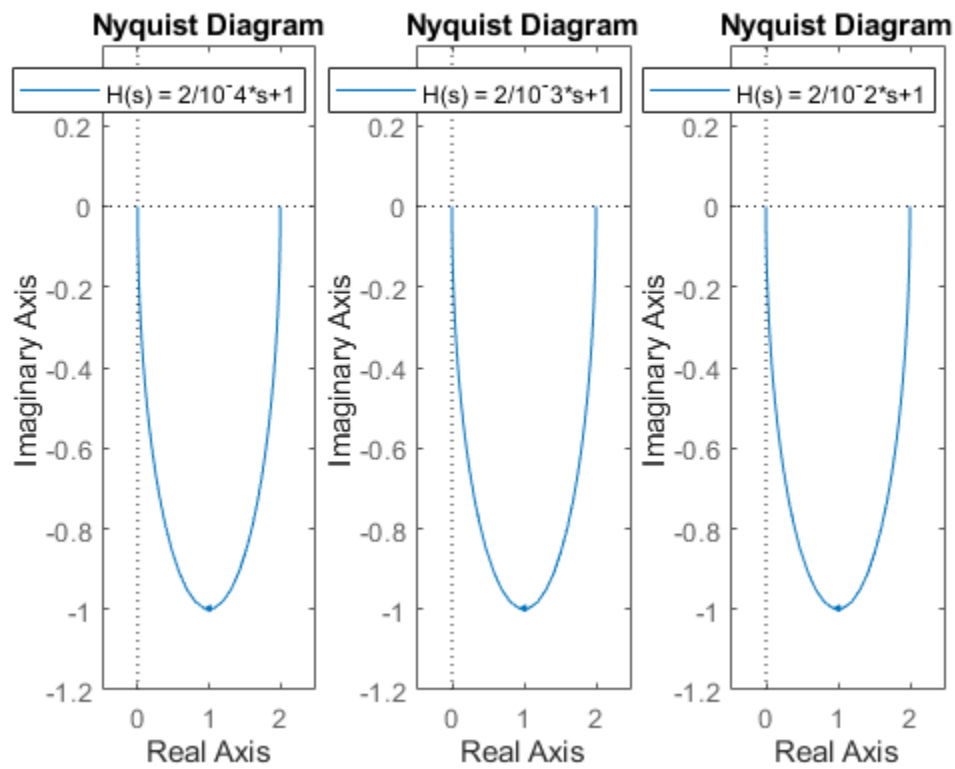
subplot(1,3,2)
nyquist(H12,plotoptions);
axis([-0.5 2.5 -1.2 0.4])
legend('H(s) = 2/10^-3*s+1')

subplot(1,3,3)
nyquist(H13,plotoptions);
```

```
axis([-0.5 2.5 -1.2 0.4])  
legend('H(s) = 2/10^-2*s+1')
```

Warning: This plot type does not support this option for the "axis" command.





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