Homework #9: Chapters 4 and 5 (due Nov. 6, 2015)

Preliminary

- Textbook reading Ch. 4.5 - 4.8, Ch. 5.0-5.1 (pp. 322-367)
- As a reminder, EE312 office hours are on Wed. from 9:00-10:00am and Thu. from 3:00-4:00pm.
- Please direct all email to pdeleon@nmsu.edu (do not send email via Canvas). All requests for bonus points will receive a confirmation email within 48 hours.
- In order to receive full credit for homework problems, you must provide a detailed solution. Simply writing a few, summarized steps toward the answer will result in minimal credit.
- All problems are worth +10 points unless otherwise noted.

Textbook Problems

4.21(a)	4.33(a), (b)	4.34
5.1(a)	5.2(a)	5.3(a)
5.21(a),(f),(h)		

Software Problems

Refer to Homework #8 for information on using MATLAB for frequency analysis systems. Listed below is example MATLAB code for Problems #1 and #2.

1. For the following system

$$\frac{d^2y(t)}{dt^2} + 4\frac{dy(t)}{dt} + 3y(t) = \frac{dx(t)}{dt} + 2x(t)$$

   compute and plot the frequency response using 'freqs' command.

2. Plot the magnitude and phase response of the system in Prob. 4.19.
3. Plot the magnitude and phase response of the system in Prob. 4.33(a).
4. Plot the magnitude and phase response of the system in Prob. 4.34.

```
% Prob. 1
a = [1 4 3]; % feedback coefs see eq (4.76) and 'help freqs'
b = [1 2]; % feedforward coefs see eq (4.76)
[H,w] = freqs(b,a);

figure(1);plot(w,abs(H));
ylabel('|H(j\omega)|');xlabel('\omega (rads/s)');grid;title('Magnitude response')

figure(2);plot(w,angle(H));
ylabel('\angle H(j\omega) (rads)');xlabel('\omega (rads/s)');
axis([min(w) max(w) -pi pi]);grid;title('Phase response')
```

```
% Prob. 2
w = [0 1000]; % pick a range of freqs
H = 1./(j.*w + 3);

figure(1);plot(w,abs(H));
ylabel('|H(j\omega)|');xlabel('\omega (rads/s)');grid;title('Magnitude response (4.19)')

figure(2);plot(w,angle(H));
ylabel('\angle H(j\omega) (rads)');xlabel('\omega (rads/s)');
axis([min(w) max(w) -pi pi]);grid;title('Phase response (4.19)')
```