1. Compare the time-domain response of five-pole Bessel, Butterworth, and elliptic filters.
   
   (a) Design a five-pole Butterworth filter with a 3-dB cutoff frequency of $4\pi$ rad/sec. (Use the MATLAB function `buttap` to design a filter with a 1 rad/sec 3-dB point, and use the MATLAB function `lp2lp` to transform it to a filter with a $4\pi$ rad/sec 3-dB point.) Plot the gain and phase of the filter (using linear plots) from 0 to 20 rad/sec.
   
   (b) Use the MATLAB `lsim` function to compute and plot the output of the filter for the input $x(t) = u(t) - u(t - 1)$.
   
   (c) Repeat Parts (a) and (b) for a five-pole Bessel filter. Use the MATLAB function `besselap`.
   
   (d) Repeat Parts (a) and (b) for a five-pole elliptic filter. Use the MATLAB function `ellipap`. For `ellipap`, specify $R_p$ of 3 dB, and $R_s$ of 60 dB.
   
   (e) Which of the three filters has the best time-domain response – that is, which has the least amount of overshoot and undershoot ("ringing").


3. Problem 10.3.

4. Problem 10.4.

5. Problem 10.5.