Homework #6
Due Th 04/30

1. (OS 6.50)
2. A sixth-order filter with system function

   $$H(z) = \frac{(1+z^{-2})(1+z^{-1})^2(1-2\cos\left(\frac{\pi}{6}\right)z^{-1}+z^{-2})}{(1-1.6\cos\left(\frac{\pi}{4}\right)z^{-1}+0.64z^{-2})(1+1.6\cos\left(\frac{\pi}{4}\right)z^{-1}+0.64z^{-2})(1-1.8\cos\left(\frac{\pi}{4}\right)z^{-1}+0.81z^{-2})}$$

   is to be implemented as a cascade of second-order sections. Considering only the effects of round-off noise, determine what is the best pole-zero pairing and the best ordering of the second-order sections.

   Draw the pole/zero plot and give $H_i(z)$ for each of the $i = 1, 2, 3$ stages.
3. (OS 7.2)
4. (OS 7.4)
5. (OS 7.5)
6. (OS 7.9, 7.10)
7. (OS 7.13, 7.14)
8. (OS 7.22)