In-Class Problem 1 (10/30/06)
Consider the causal LTI system with transfer function

\[ H(s) = \frac{s - 20}{s + 20}. \]

(a) Sketch the pole-zero plot for this system.

(b) Sketch the magnitude of the frequency response of this system.
In-Class Problem 2  (10/30/06)
Consider the transfer function $H(s) = \frac{P(s)}{Q(s)}$. The function $H(s)$ is proper if the order of the numerator polynomial ($P(s)$) is less than or equal to the order of the denominator polynomial ($Q(s)$). $H(s)$ is strictly proper if the order of the numerator polynomial is less than the order of the denominator polynomial.

(a) Why must $H(s)$ be strictly proper for lowpass and bandpass filters?

(b) Why must $H(s)$ be proper for highpass and bandstop filters?