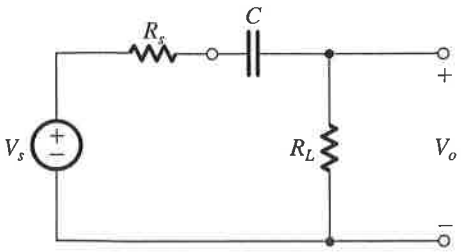
Hwk #2 - EE352

Winter 2012

Due Friday Jan. 13 in class

Team Member Names:

D*E.2 (a) Find the voltage transfer function $T(s) = V_o(s)/V_i(s)$, for the STC network shown in Fig. PE.2.



E.7 An amplifier has a voltage transfer function $T(s) = 10^6 s/(s+10)(s+10^3)$. Convert this to the form convenient for constructing Bode plots [that is, place the denominator factors in the form $(1 + s/a)$]. Provide a Bode plot for the magnitude response, and use it to find approximate values for the amplifier gain at 1, 10, 10^2, 10^3, 10^4, and 10^5 rad/s. What would the actual gain be at 10 rad/s? At 10^3 rad/s?

E.8 Find the Bode phase plot of the transfer function of the amplifier considered in Problem E.7. Estimate the phase angle at 1, 10, 10^2, 10^3, 10^4, and 10^5 rad/s. For comparison, calculate the actual phase at 1, 10, and 100 rad/s.

E.9 A transfer function has the following zeros and poles: one zero at $s = 0$ and one zero at $s = \infty$; one pole at $s = -100$ and one pole at $s = -10^6$. The magnitude of the transfer function at $\omega = 10^4$ rad/s is 100. Find the transfer function $T(s)$ and sketch a Bode plot for its magnitude.

E.10 Sketch Bode plots for the magnitude and phase of the transfer function

$$T(s) = \frac{10^4(1 + s/10^5)}{(1 + s/10^3)(1 + s/10^4)}$$

From your sketches, determine approximate values for the magnitude and phase at $\omega = 10^6$ rad/s. What are the exact values determined from the transfer function?

E.11 A particular amplifier has a voltage transfer function $T(s) = 10s^2/(1 + s/10)(1 + s/100)(1 + s/10^6)$. Find the poles and zeros. Sketch the magnitude of the gain in dB versus frequency on a logarithmic scale. Estimate the gain at 10^0, 10^3, 10^5, and 10^7 rad/s.