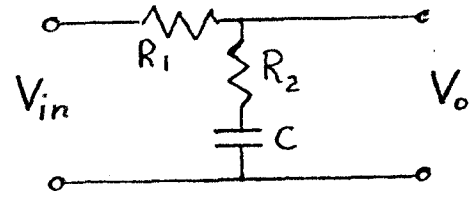
5. a. If $H(s)=V_o(s)/V_{in}(s)$ where $V_o(s)$ is the output voltage and $V_{in}(s)$ is the input votlage, $V_{in}(s) = Ae^{st}$ and $s= \sigma + j\omega$, find the H(s) for the circuit shown below ($j = \sqrt{-1}$).



b) Find the poles and zeros of H(s).

c) Make rough sketches of the frequency response of $H(j\omega)$ in the form: (1) log $|H(j\omega)|$ vs. log ω and (2) phase $H(j\omega)$ vs. log ω. Label any constant values and asymptotic slopes.

d) It is possible for a closely related circuit to act as an ideal integrator. What H(s) would be expected in that case?

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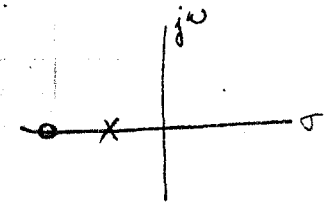
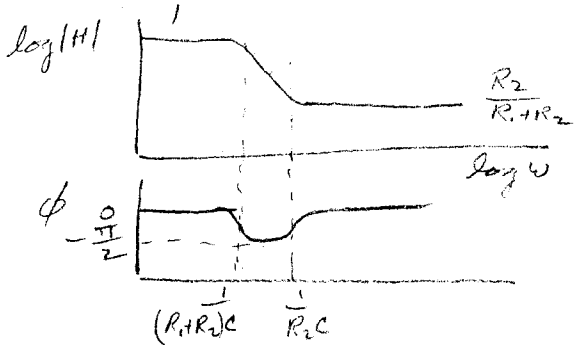
a) $H(s) = \dfrac{(R_2 + \frac{1}{sC})}{(R_1)+(R_2 + \frac{1}{sC})} = \dfrac{1 + R_2Cs}{1 + (R_1+R_2)Cs}$

b) zero: $s = -\dfrac{1}{R_2C}$

pole: $-\dfrac{1}{(R_1+R_2)C}$



c)



d) $\int e^{st} = \frac{1}{s}e^{st}$

so $H(s) = \text{const} \cdot \frac{1}{s}$