

Problem 1

Given the amplifier in Figure 1

- Find the input and output resistance
- Construct an equivalent circuit using a voltage amplifier two-port model and determine all model parameters symbolically
- Repeat part (b) for a current amplifier model
- Repeat part (b) for a transconductance amplifier model
- Repeat part (b) for a transresistance amplifier model

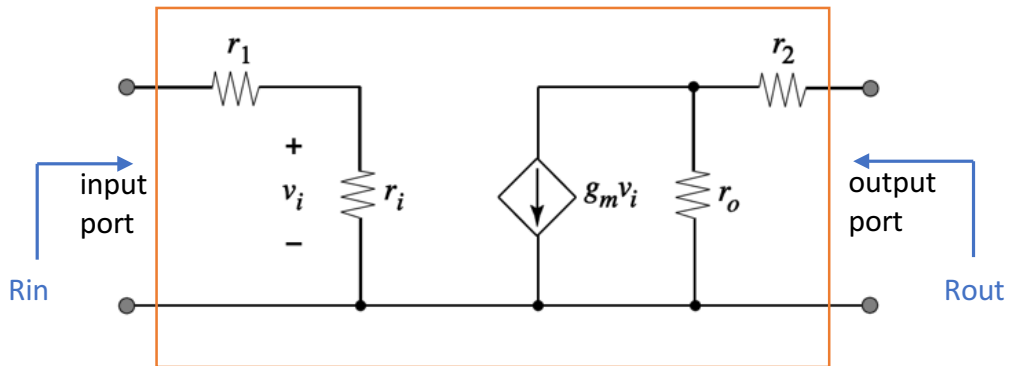


Figure 1

Problem 2

Convince yourself that the circuits of Figure 2 and Figure 3 are equivalent by showing symbolically that both circuits have the same overall voltage gain:

$$A_v^* = \frac{v_{out}}{v_s}$$

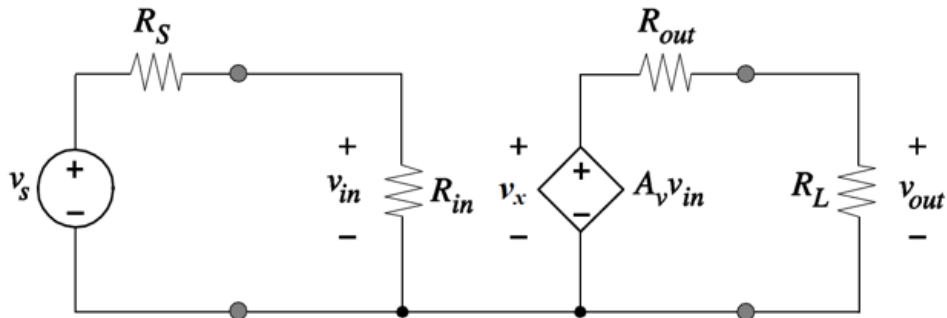


Figure 2

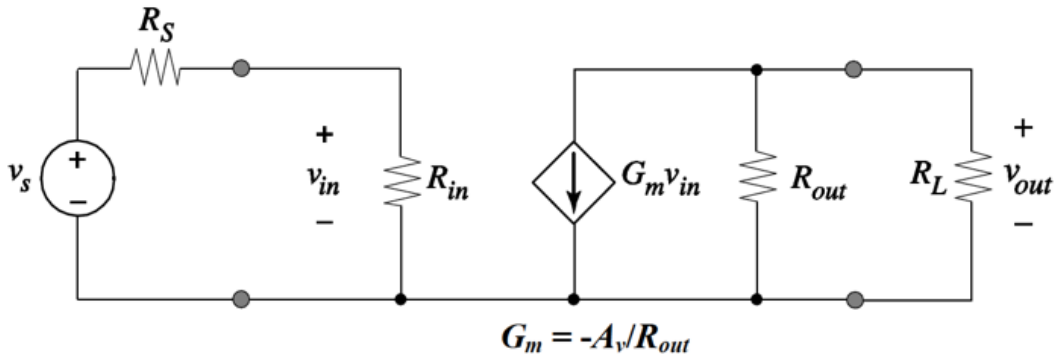


Figure 3

Problem 3

Given the circuit shown in figure 4, derive its transfer function and sketch the asymptotic Bode Plot for the magnitude $|V_{out}/V_{in}|_{dB}$ and phase $\angle V_{out}/V_{in}$

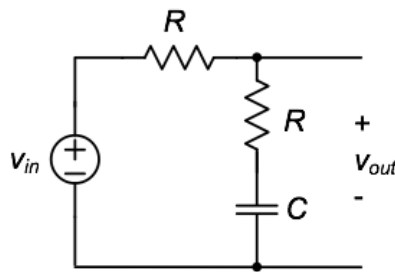


Figure 4

Verify your Bode plots using Matlab. Attach your Matlab figure.

Problem 4

Sketch the asymptotic Bode plot for the magnitude $|I_o/I_s|_{dB}$ and phase $\angle I_o/I_s$ of the circuit shown in Figure 5. Assume $R_1=10K\Omega$, $R_2=100K\Omega$, $C=1pF$

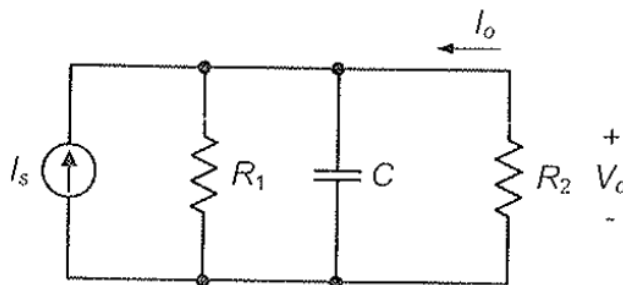
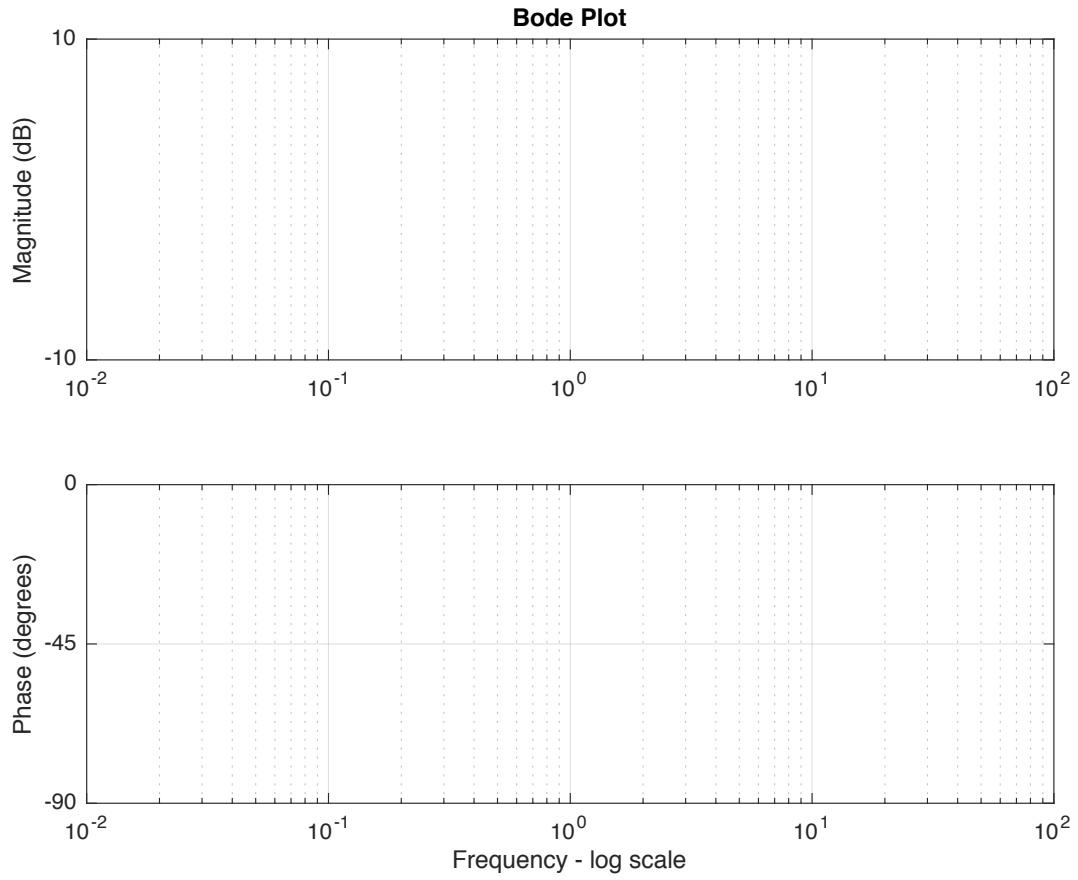


Figure 5

Verify your Bode plots using Matlab. Attach your Matlab figure.

Bode Paper for Problem 3



Bode Paper for Problem 4

