EEO 311
Quiz 6

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1 What would be the DC gain of the 2-stage circuit in dB units?

Find total gain AV_{total}

$$AV_{total} = AV_1 \cdot AV_2$$
$$AV_{total} = 10 \cdot 10 = 100$$
$$AV_{total} = 20\log(100) = 40\,\text{dB}$$

2 A sinusoidal voltage with the amplitude of 1 mV and a 100 MHz frequency was applied to the input of the 1st stage of the circuit. What would be the amplitude of the output voltage of the 2-stage circuit?

Find V_{out}

$$V_{out} = V_{in} \cdot (\frac{1}{\sqrt{2}} \cdot AV_1) \cdot (\frac{1}{\sqrt{2}} \cdot AV_2)$$
$$V_{out} = 1\,\text{mV} \cdot (\frac{1}{2} \cdot 100) = 50\,\text{mV}$$

3 What would be the cut-off frequency of the 2-stage circuit in MHz at the -3 dB level?

$$f_{c\_2\text{-stage}} = \frac{1}{\sqrt{2}} \times f = 0.707 \times 100\,\text{MHz} = 70.7\,\text{MHz}$$

4 What would be the phase angle of the transfer function of the 2-stage circuit at the cut-off frequency?

Phase shifts are summed in series-connected LPF's. Each Stage is introducing $-45°$, therefore a total phase shift of $-90°$ is seen at the output.