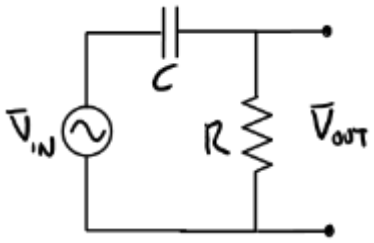
RC Filter Examples (17:55)



Given: $\mathbf{V_{IN}} = 30V\angle 0°$
$C = 0.4\mu F$
$R = 200\Omega$

Determine the critical frequency for the above circuit.

Determine $\mathbf{V_{OUT}}$ at the critical frequency, normalize the output and express gain in units of dB.

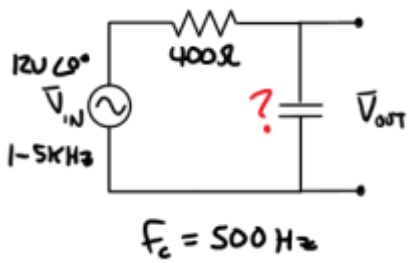
Determine $\mathbf{V_{OUT}}$ at 500Hz and express gain in units of dB.

Determine $\mathbf{V_{OUT}}$ at 8kHz and express gain in units of dB.

Draw a plot of output voltage as a function of frequency on a semi log plot.

Draw a plot of gain as a function of frequency on a semi log plot.

Use the shortcut method to calculate gain at 50Hz.



Given this series RC filter circuit determine the capacitance level necessary for a 500Hz critical frequency.

Use the properties of RC filters to determine the output voltage and gain in units of dB at the critical frequency.

Determine output voltage and gain of the above circuit at 100Hz.

Determine output voltage and gain of the above circuit at 2.5kHz.

Plot gain in units of dB for the above circuit as a function of frequency on a semi-log plot.

Use the shortcut gain calculation method to calculate gain at 2.5kHz. Compare and contrast this result with the previous calculation.

Identify regions where the shortcut gain calculation method does not yield reliable results.

Use your understanding of complex impedance and Ohm's Law to explain the behavior of RC filters.