Build the following 4-stage RC filter

![RC Filter Circuit Diagram]

1) Set the input to 5Vp 100Hz sine wave
Measure the signal at V1 .. V4
Express V1 .. V4 as a phasor assuming
\[ V0 = 5 + j0 \]

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Sample Calculations: To measure the gain and phase shift at 100Hz, display both Vin and Vout on the oscilloscope. For example, if the traces look like the following:

Define the input (blue) curve to be 0 degree reference. Since it's peak is 3.0V

\[ V_{\text{blue}} \equiv 3 \angle 0^0 \]

The output (red) is 2.2V.

\[ V_{\text{red}} = 2.2 \angle \theta \]

Phase Calculations:

One cycle is 360 degrees. The output (red line) is delayed from the input by

\[ \theta = \left( \frac{1 \text{ms delay}}{10 \text{ms period}} \right) \cdot 360^0 = -36^0 \]

( negative phase is a delay, positive phase is a time advance )

So, the phasor representation for the red curve is

\[ V_{\text{red}} = 2.2 \angle -36^0 \]