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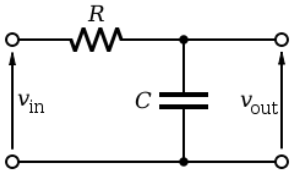
Introduction To Analog Electronics – Lesson 5: RL/RC Passive Filters

FORMULAS

The following formulas and information are meant to go with the online lesson found here:
http://www.pyroelectro.com/edu/analog/passive_filters/

RC AND RL FILTER FORMULAS

In this lesson we learned how capacitors and inductors could be combined with a resistor to form a low or high pass filter. The point where the filter begins to 'cut-off' frequency is important to know when you want to make a filter. Below we will take a second look at the formulas for doing that and how to use them. First, we will take a look at a RC low pass filter:

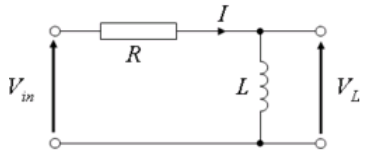


$$f_c = \frac{1}{2\pi R C}$$

If R = 1 and C = 1uF or $(1 \times 10^{-6}\ F)$

$$f_C = \frac{1}{2 \times \pi \times R \times C} = \frac{1}{2 \times 3.1418 \times 1 \times (1 \times 10^{-6}\ F)} = \mathbf{159,154.9\ Hz}$$

Now, let's take a look at how to construct a high pass filter using an inductor. The circuit and the formula are seen below:



$$f_c = \frac{R}{2\pi L}$$

If R = 1 and L = 100uH or $(100 \times 10^{-6}\ H)$

$$f_C = \frac{R}{2 \times \pi \times L} = \frac{1}{2 \times 3.1418 \times (100 \times 10^{-6}\ F)} = \mathbf{1,591.5\ Hz}$$

ADDITIONAL INFORMATION

If you have any questions about the formulas or information found in this document, please feel free to head on over to the forums and ask us some questions!
http://www.pyroelectro.com/forums/