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Introduction To Analog Electronics – Lesson 6: RLC Filters

FORMULAS

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

RLC FILTER FORMULAS

In this lesson we looked at and used 3 core formulas for building and understanding an RLC bandpass filter. The first formula was for determining which frequency would pass through the filter without any changes, the center frequency:

$$\omega_0 = \frac{1}{\sqrt{LC}}.$$

Remember that this formulas yields a result with the unit of radians per second, so if you want to see it in Hertz, make sure to divide your answer by $(2 \times \pi)$.

$$\omega_1 = -\frac{R}{2L} + \sqrt{\left(\frac{R}{2L}\right)^2 + \frac{1}{LC}}$$

$$\omega_2 = \frac{R}{2L} + \sqrt{\left(\frac{R}{2L}\right)^2 + \frac{1}{LC}}$$

The next two formulas that we saw and used were for finding the upper and lower 'cut-off' frequencies of the filter. These two points are used as the 'point of no return' for any frequency beyond these limits as they will be filtered out, but any frequency inside of the two cut-off frequency range will pass through the filter with only minimal changes.

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/