Phys219_2017 - Ryan Kaufmann/Exp. 4 (OpAmps)/Prelab assignment for Exp 4

SIGNED by Ryan Kaufmann Nov 06, 2017 @11:51 AM PST

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Experiment 4: Operational Amplifiers

Partner: Eric Brock

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4.1 Prelab

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For the first part of this lab, we want to create a circuit using an operational amplifier that has a voltage gain of 200. The circuit is as follows:

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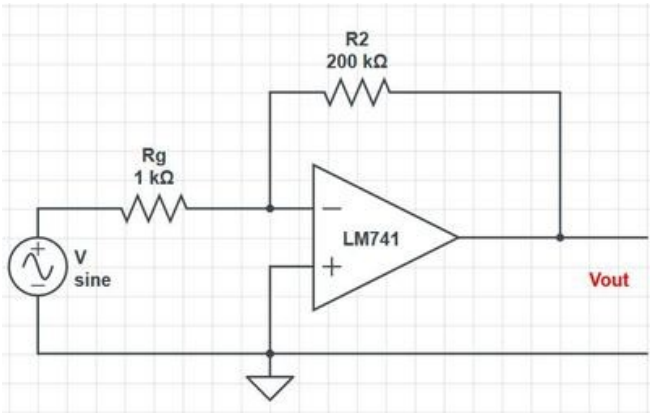

OpAmp200GainPrelab.jpg(42.1 KB)

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Working with this circuit, we can also plot a couple of scenarios. The first scenario has an input of 50 mV and frequency 100 Hz. The second scenario has an input of 10mV, frequency of 100 Hz, and offset of 50mV. We get the following graphs of the output voltage:

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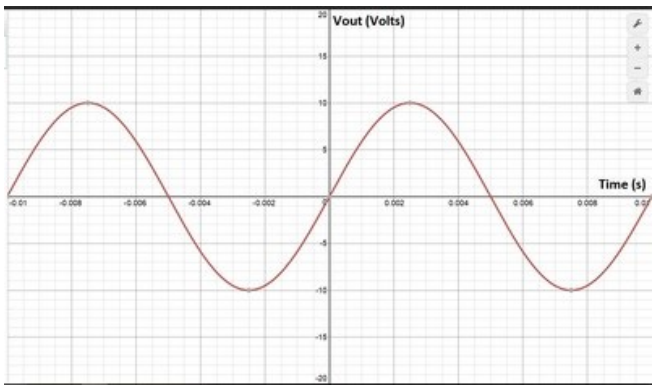

FirstGainEquation.jpg(228.7 KB)

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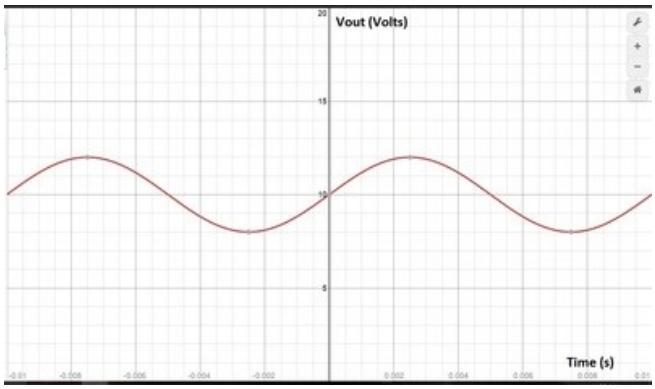

SecondGainEquation.jpg(174.1 KB)

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We can also talk about the differences between ideal and non-ideal op amps. The main parameters that define non-ideal op amps are impedance and open loop voltage gain. In ideal op amps, these tend to go towards infinity.

Finally we will look at the bandwidth frequency of an op amp. We can use the graph for the gain in terms of frequency to figure this out:

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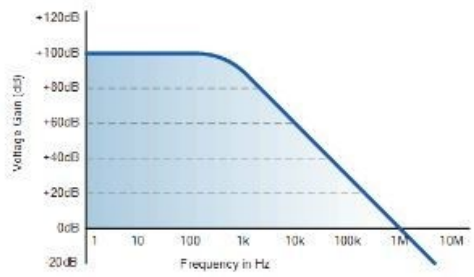

Graph.jpg(14.4 KB)

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We can approximate when the gain drops to sqrt(2) of the origianl value. We estimate this to be about 1 kiloOhm.