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Lesson 4
10/03/12

Summary of Lesson: Logarithm Lab

A lab experiment on how logarithms worked was done. The students used a function generator set to 2000 Hz and this was connected to a logarithmic attenuator. The signal was then analyzed on an oscilloscope. Students understood that an amplifier increases the loudness of sound. I explained that an attenuator decreases the amplitude or loudness of sound. In our case we saw the amplitude decrease in the signal. The problem with this experiment was that there was no speaker attached, so the students could not grasp the concept of logarithm. Homework for the students to analyze the data table was assigned, but was not followed up.

Logarithmic Measurement Experiment

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Equipment

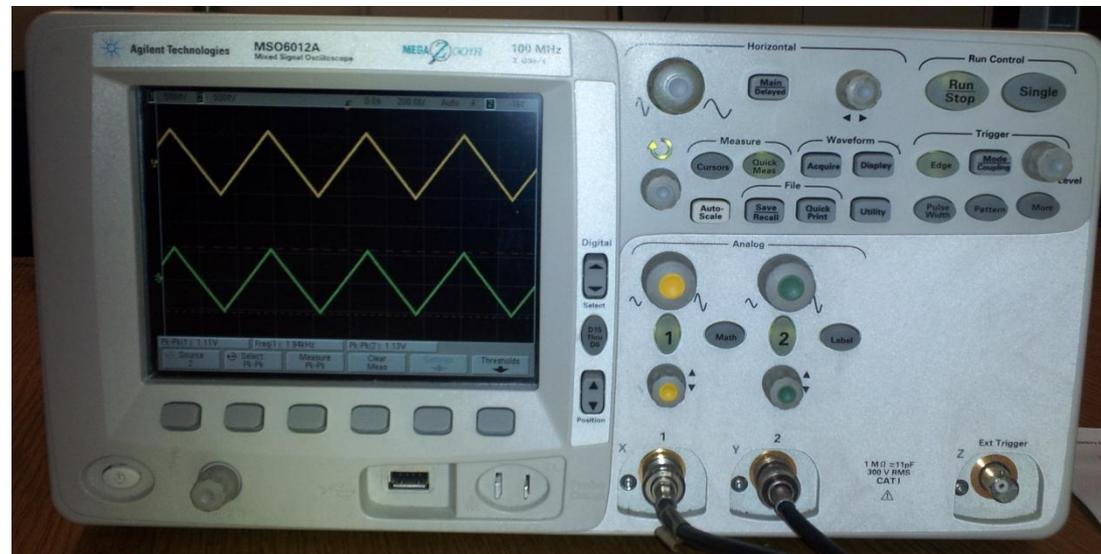
Frequency Generator



Attenuator



Oscilloscope



Experiment

- Set function generator to generate a signal of frequency 2000 Hertz
- This signal is attenuated.
 - Set attenuator dial $A = 0, 10, 20, 30$ dB
- For each setting, measure the voltage level V from the oscilloscope.
- Create table A vs V

HOMEWORK

- Examine the A vs V table and find out how V is decreasing
- We will discuss this on Thursday

Name _____

Lab – Logarithmic Measurement

Objective: Understand why we use Logarithmic Scale

Hypothesis: _____

Materials Needed:

- Oscilloscope
- Logarithmic Attenuator
- Frequency Generator
- Coaxial Cables
- Paper, Pen/Pencil

Procedure:

1. Connect all equipment.
2. Start at 0dB on the attenuator A.
3. Measure the voltage V.
4. Record data.
5. Repeat for -10dB, -20dB, -30dB
6. Plot the data.
7. Analyze the data collected and compare with calculations.

Calculations:

$$dB = 20 \log_{10} x$$

Solve for x to find the multiplication factor.

$$\frac{dB}{20} = \log_{10} x$$

$$10^{\frac{dB}{20}} = x$$

The first calculation is done for you

$$0dB = 20 \log_{10} x$$

$$0 = \log_{10} x$$

$$10^0 = x$$

$$x = 1$$

