EE430 Lab #1
Spectrum analysis

This is an informal lab. It has not been tested, so prepare for surprises!

1. Setting up

Set up the spectrum analyzer as following. As you do, familiarize yourself with the controls so you can change them later.

- Connect to input R.
- Measure -- Analyzer type -- Spectrum -- R.
- Start -- 0 -- x1.
- Stop -- 1 -- M.
- Scale Ref -- 20 dBm.
- BW/Avg -- 100 Hz.

2. A sine wave

Set the signal generator to produce a Sine wave, 100 kHz, 1 v peak-to-peak. Show the spectrum, up to 1 MHz. Check both generators. Which is better?

3. A triangle

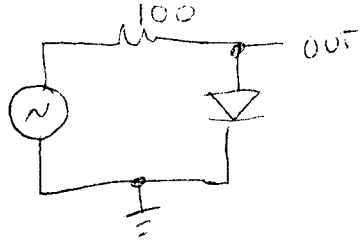
Repeat for a triangle wave. Only use the better generator.

4. A square wave

Repeat for a sine wave.

5. Harmonic distortion

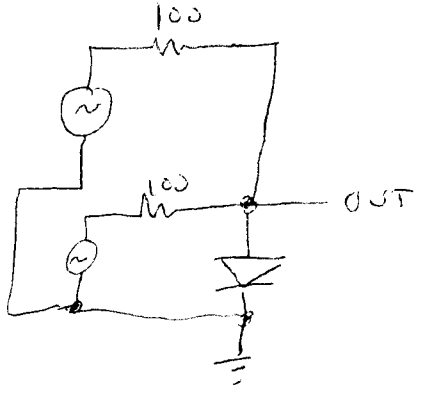
Build this circuit:



Apply a 100 kHz sine wave input at .5 volt p-p. Show the waveform and spectrum. Increase the signal gradually to 10 volts p-p. Show the output waveform and spectrum at 10 volts p-p input. Comment on what you see.

6. Intermodulation distortion

Build this circuit:



Apply 100 kHz and 1 kHz sine waves at .5 volts p-p each. Show the waveform and spectrum. Show the frequency ranges of 90 kHz to 110 kHz, and 0 to 10 kHz. Increase the signals as before, and show the spectrum at 1,2, and 10 volts p-p input. Which components are non-harmonic? Comment on what you see.

Apply 100 kHz and 101 kHz sine waves at .5 volts p-p each. Show the waveform and spectrum. Show the frequency ranges of 90 kHz to 110 kHz, and 0 to 10 kHz. Increase the signals as before, and show the waveform and spectrum at 1,2, and 10 volts p-p input, keeping both equal. Which components are non-harmonic? Comment on what you see.