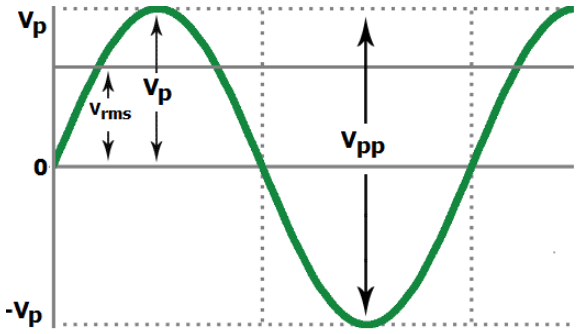
MECE 246 – LAB 1

1. Connect the output of the function generator to the oscilloscope and simultaneously to the DMM in order to measure the same signal with the two instruments.
2. Turn on the oscilloscope. The input signal must be connected with the coupling switch in AC position.
3. Turn on the DMM and select the AC voltage measurement. Take note of the voltage measurement simultaneously with the oscilloscope.
4. The signals to be set on the function generator are:
   Sinewave 1000 Hz.
   Squarewave 20000 Hz.
   Sinewave 10 Hz.
   Sinewave 2 MHz (2000000 Hz).
5. Verify the period and the amplitude of the signal coming from the function generator. The function generator has a frequency counter on the front panel. Verify this frequency matches the one obtained with the oscilloscope.
6. Adjust the Volt/Division and the Time/Division so that one waveform is well displayed on the screen.
7. Switch the input coupling to GND. You will get a line.
8. Using the X, Y position knobs make sure the line is centered on the screen.
9. Switch the coupling back to AC.
10. Measure the Period of the signal.
11. Measure the amplitude and the peak-to-peak value of the signal. See question 2
12. Calculate the rms value of the signal.

$$u_{RMS} = \sqrt{\frac{1}{T}\int_0^T u(t)^2 \cdot dt}$$



$$V_{rms} = \frac{1}{\sqrt{2}} * V_p = 0.7071 * V_p$$

$$V_{rms} = \frac{1}{2\sqrt{2}} * V_{pp} = 0.35355 * V_{pp}$$

HW 1 : Derive the RMS value of given equation : $u(t) = a_1 \sin(\omega t)$, where $\omega = \frac{2\pi}{T}$

HW 2 : Derive the RMS value of given equation where a_0 is DC value : $u(t) = a_0 + a_1 \sin(\omega t)$