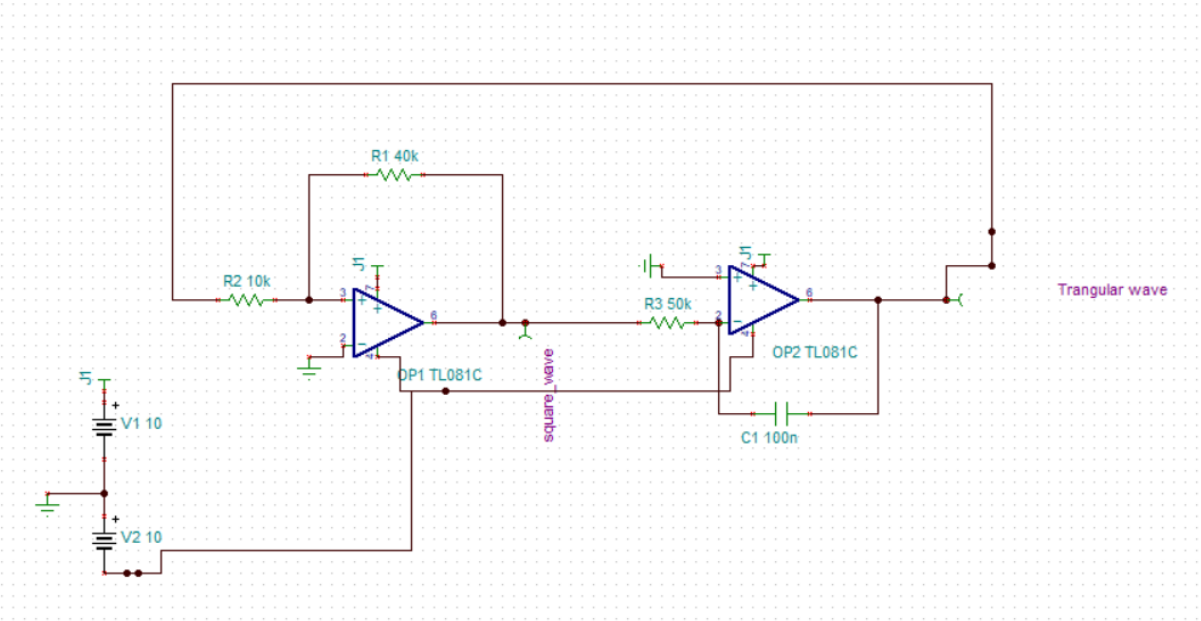
TRIANGULAR AND SQUARE WAVE GENERATOR



Time period =4(R3*R2*C1)/R1 … 1

V(P-P)=2*(R2/R1)*Vsat ….2 (triangular wave)

Calculation:

Requirement – Vpp-4V, Frequency-0.2KHz

Vsat= 8.4V

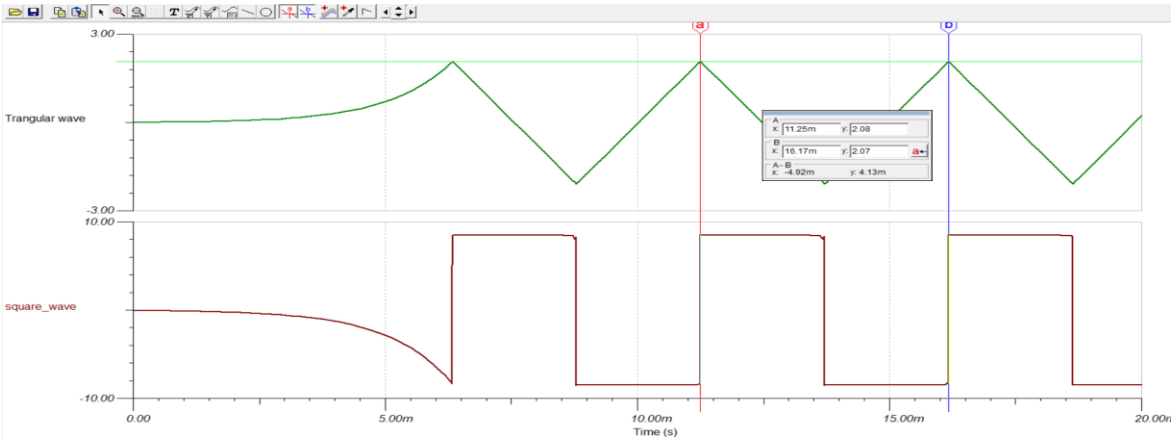
Using Eq 1 - R1/R2= 4

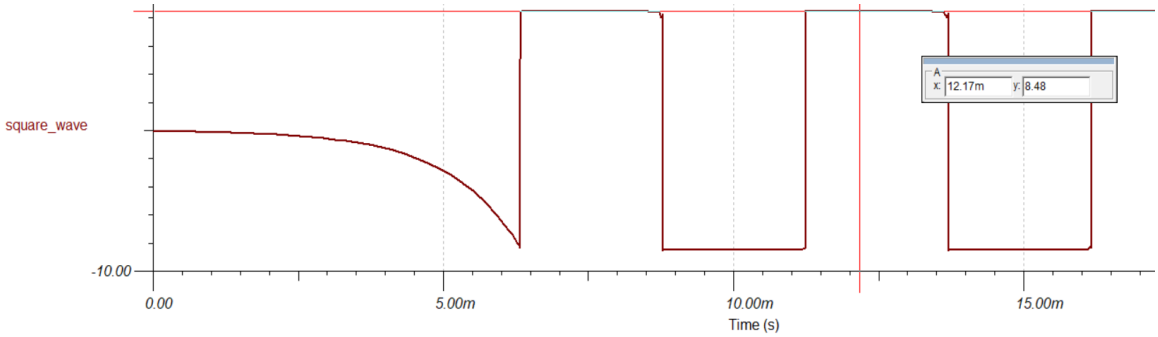
Let R1= 40KΩ , R2=10KΩ

Using eq 2- R3*C1=0.5ms

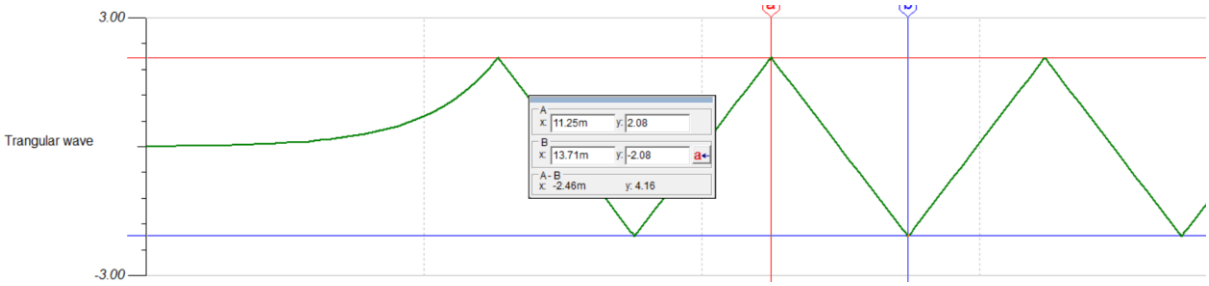
Let C1=0.01uF, R3= 50kΩ

Observations:





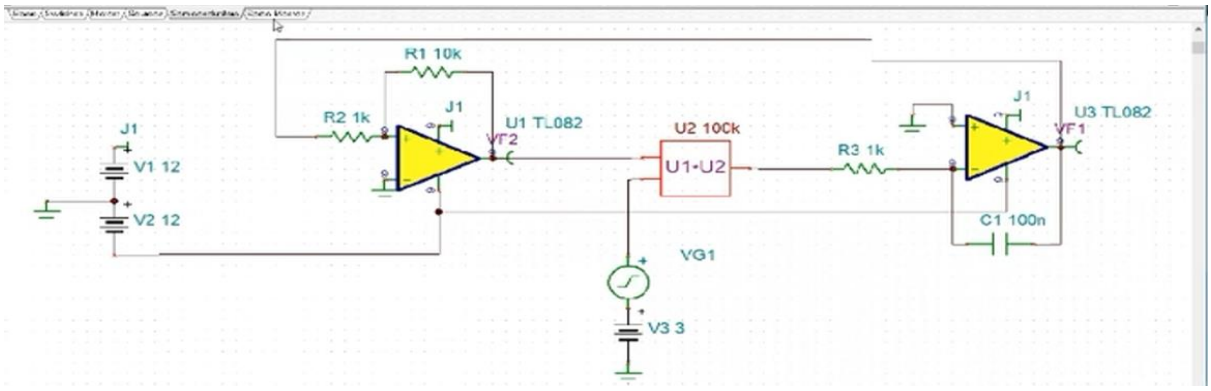
Square wave and Triangular Wave



Observed Frequency= 0.203KHz

Vpp(triangular wave)= 4.16V

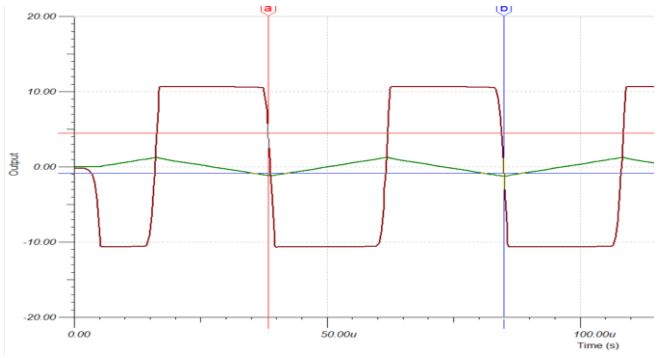
VOLTAGE CONTROLLED FREQUENCY



F= $\frac{\mathrm{R1}}{[4*\mathrm{R3}*\mathrm{R1}*\mathrm{C1}]} * \boldsymbol{Vc} * \boldsymbol{VP}$

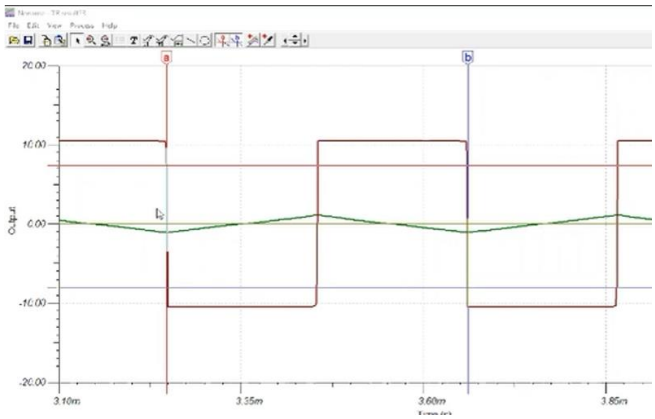
Vc= Controlling Voltage (VG1+V3)

Vp (Analog Multiplier factor)= 100mV



Time Period(T1) = 46us , **NO MULTIPLIER**

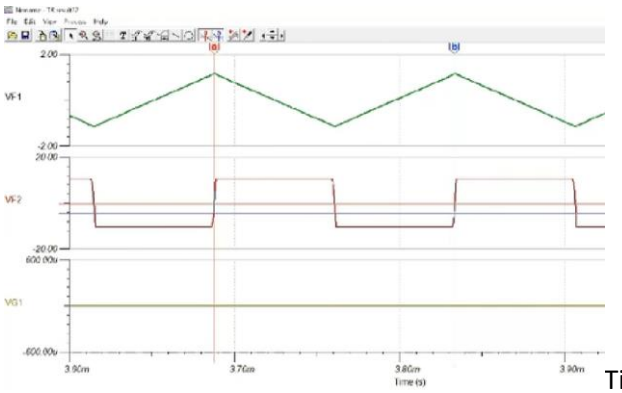
T1 (calculated)=40us(13%)



Time period (T2), observed = 412us ,Vc= 1V

Vc= VG1+V3=0V+3V

T2=T1*10/Vc=40*10/1=400us (Error=3%)

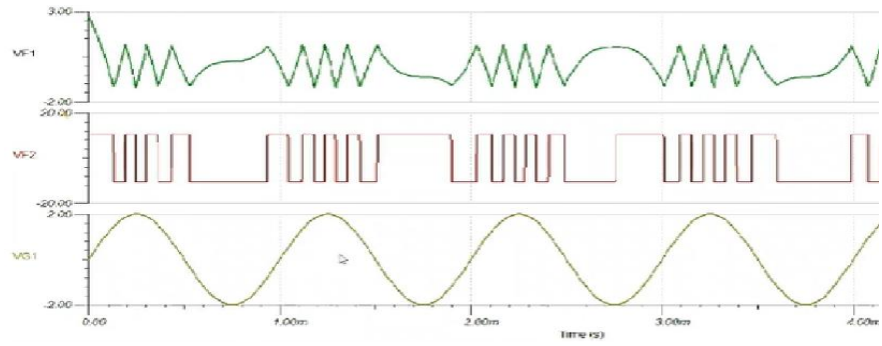


Time Period (T3), observed= 145us , VC=3V

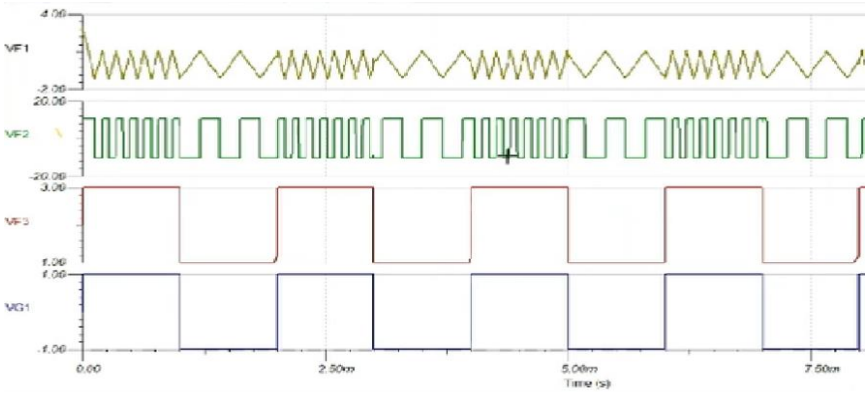
Vc= VG1+V3=0V+3V

T2=T1*10/Vc=40*10/3=133.33us (Error=8%)

USE AS FREQUENCY MODULATOR



VC= $(sin(2\pi k\omega t) + 2)V$



VC= Square wave 0-1V, 500Hz+2V