Op-amp based astable multivibrator

Astable multivibrator

An astable multivibrator switches between two states with a frequency determined by an RC time constant. This feature may be used to make a square wave generator.

When the circuit is turned ON, depending upon the initial conditions, the op amp's output saturates to either positive or negative rail. Assuming that the op amp saturates at the positive rail, the capacitor starts charging through the resistor R, and the voltage across the capacitor starts to rise. As soon as the voltage at the op amp's inverting terminal reaches that at the noninverting terminal (the op amp's output voltage divided by R_1 and R_2), the output switches over to the opposite rail and the capacitor starts to discharge.

Once the inverting terminal reaches the voltage of the non-inverting terminal, the output again drives to the opposing rail voltage and the cycle begins again. Thus, the astable multivibrator creates a square wave with no inputs.

For the circuit in Fig. 1, the time period of the output waveform is,

$$T = 2RC\ln\left(1+\frac{2R_2}{R_1}\right)$$

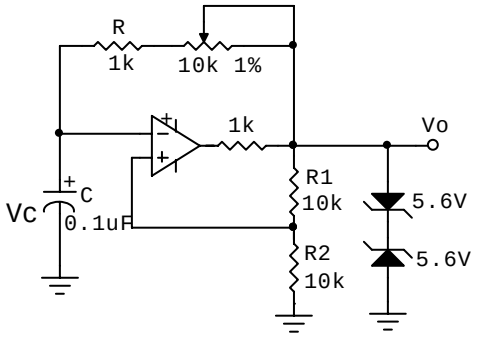

Figure 1: Astable multivibrator