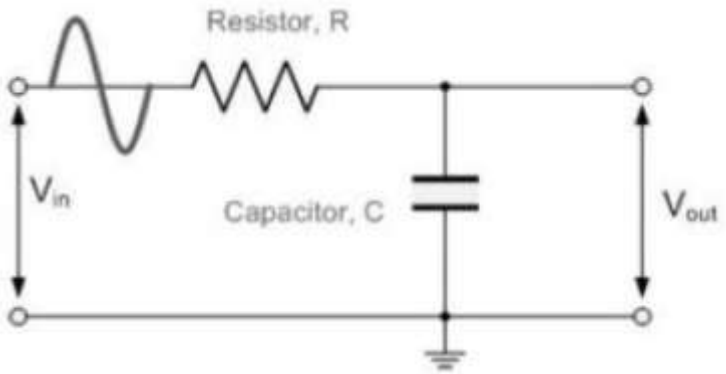
RC Low Pass Filter Circuit (Integrator)

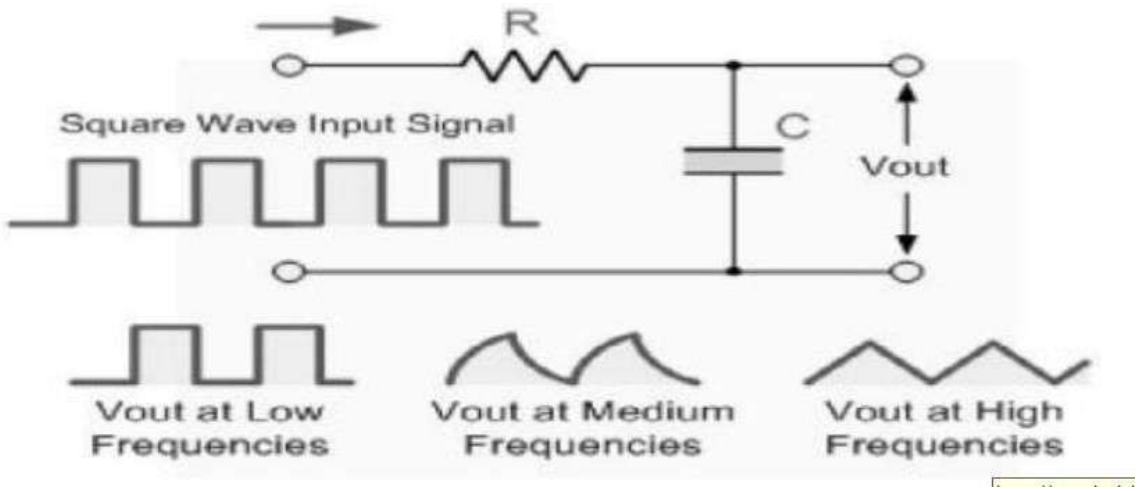
- The **Integrator** is basically a low pass filter circuit
- converts a square wave "step" response input signal into a triangular shaped waveform output as the capacitor charges and discharges.
- A **Triangular** waveform consists of alternate but equal, positive and negative ramps.
- It allows low frequency components

- A simple passive Low Pass Filter or LPF, can be easily made by connecting together in series a single Resistor with a single Capacitor

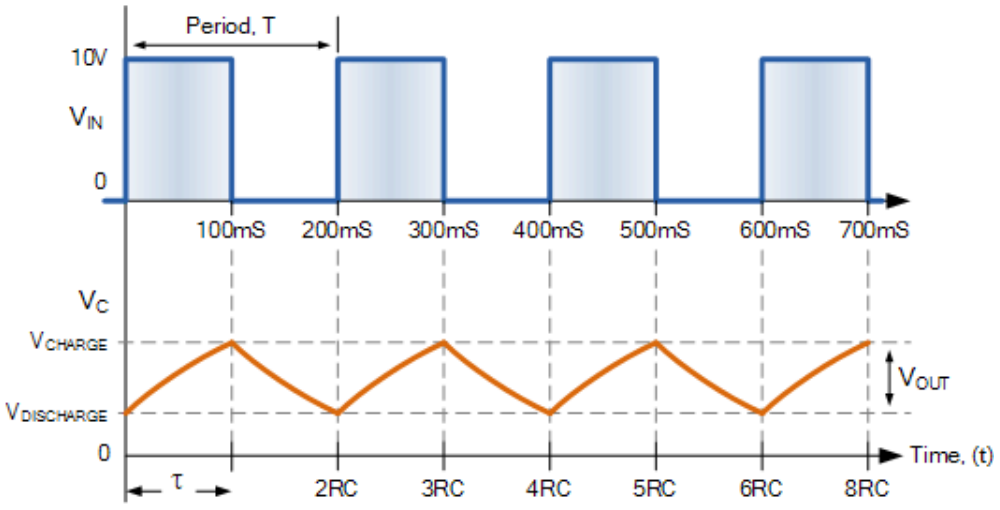


- input signal (Vin) is applied to the series combination (both the Resistor and Capacitor together)
- the output signal (Vout) is taken across the capacitor only.

- This type of filter is known generally as a "first-order filter" or "one-pole filter



RC Integrator Time Constant



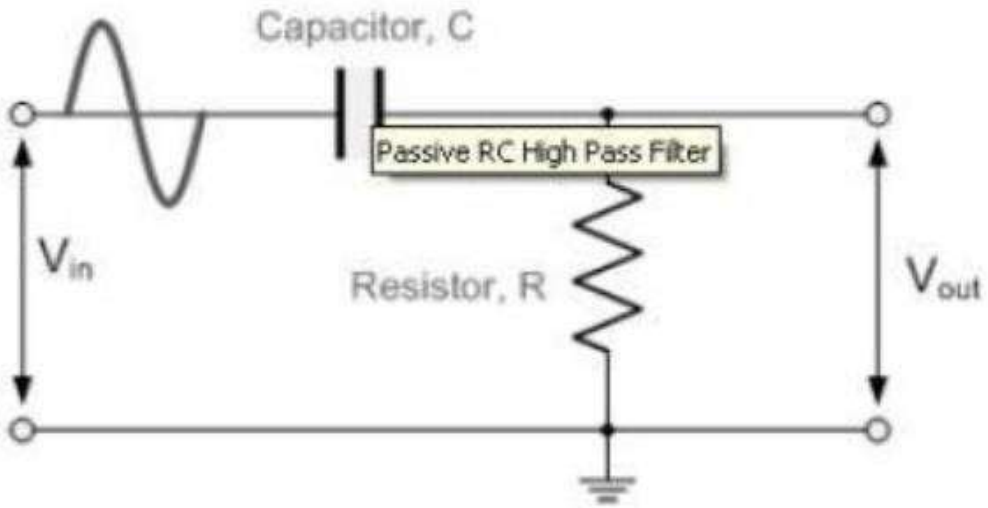
- Converting one type of electronic signal to another for use in wave-generating or wave- shaping circuits.

- The reactance of a capacitor varies inversely proportional with frequency,

$$X_c = 1/(2\pi fC)$$

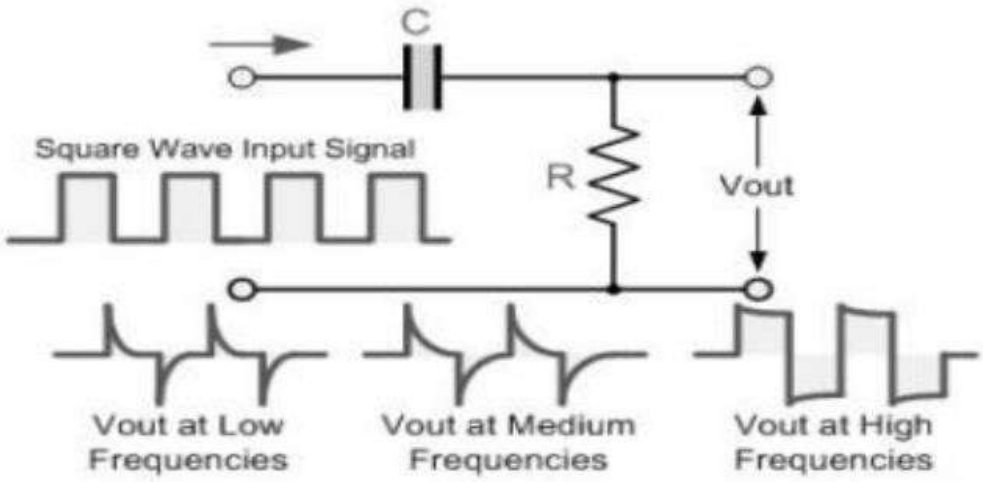
- **Xc-** reactance of a capacitor
- **Ƒ-** frequency
- RC High Pass Filter Circuit

connecting together in series a single Resistor with a single Capacitor



RC Differentiator

- **Square Wave** signal operating in the time domain giving an impulse or step response input, the output waveform will consist of short duration pulse or spikes.



- The time constant t=RC
- Square wave input waveform produces two spikes at the output, one positive and one negative and whose amplitude is equal to that of the input.