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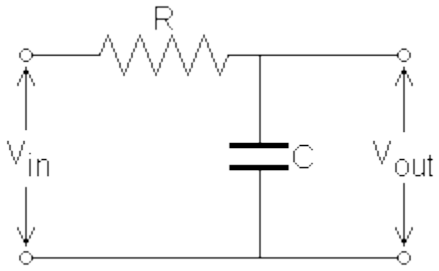
EC434: ASP Lab 1
Passive Filters: RC Integrator Circuit



Objective

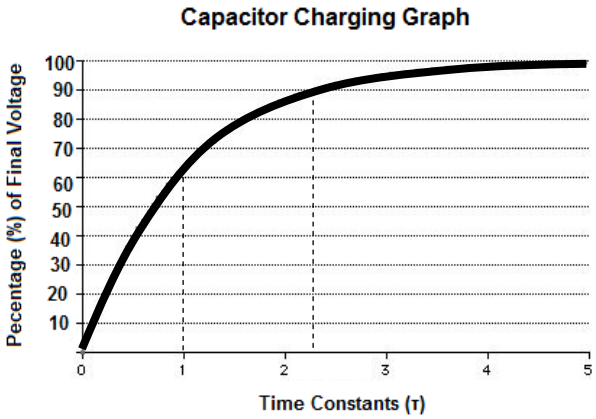
- Studying the RC integrator circuit output.
- Observing the relation between the pulse width and τ.

Theory

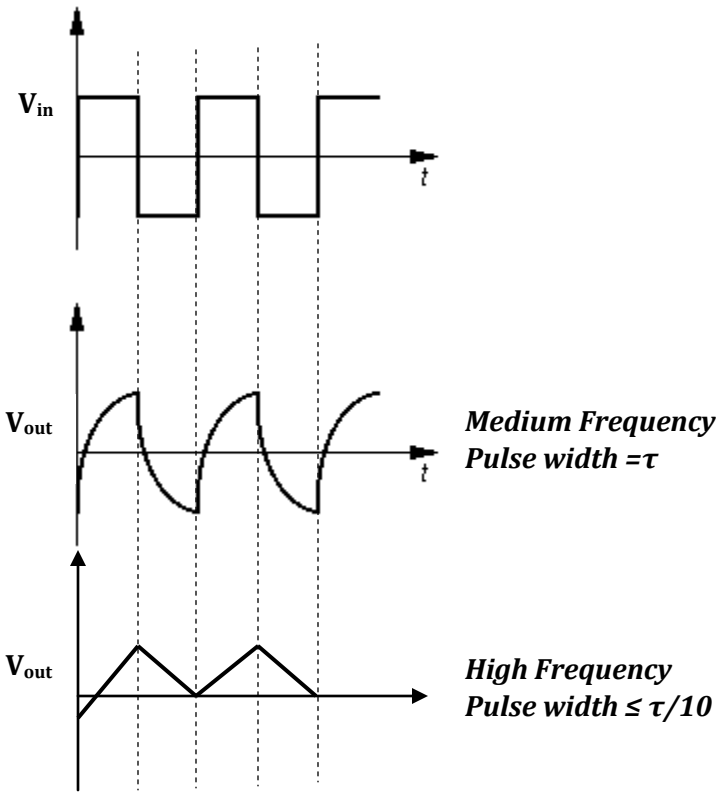
- Time Constant: the time that it takes for the capacitor to reach 63% of the EMF (V_{in}) value during charging.

$\tau = R.C$

- The RC circuit above acts as passive LPF at low frequencies and an integrator at high frequencies (i.e. Pulse width = $\frac{\tau}{10} = \frac{RC}{10}$)



- When the input is a square wave, the output of the integrator should be a triangular function.



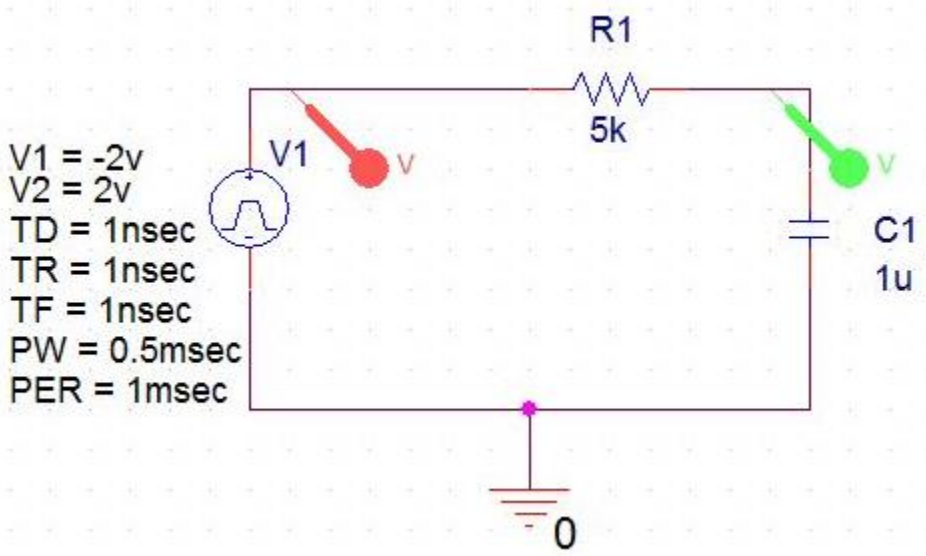
Design Steps

1. Assuming the cycle time is 1ms, calculate the input wave frequency, then input a square wave of the same frequency to the circuit (duty cycle = 50%; pulse width = T/2).
2. Using the integrator condition below, design the RC circuit choosing suitable values for R and C.

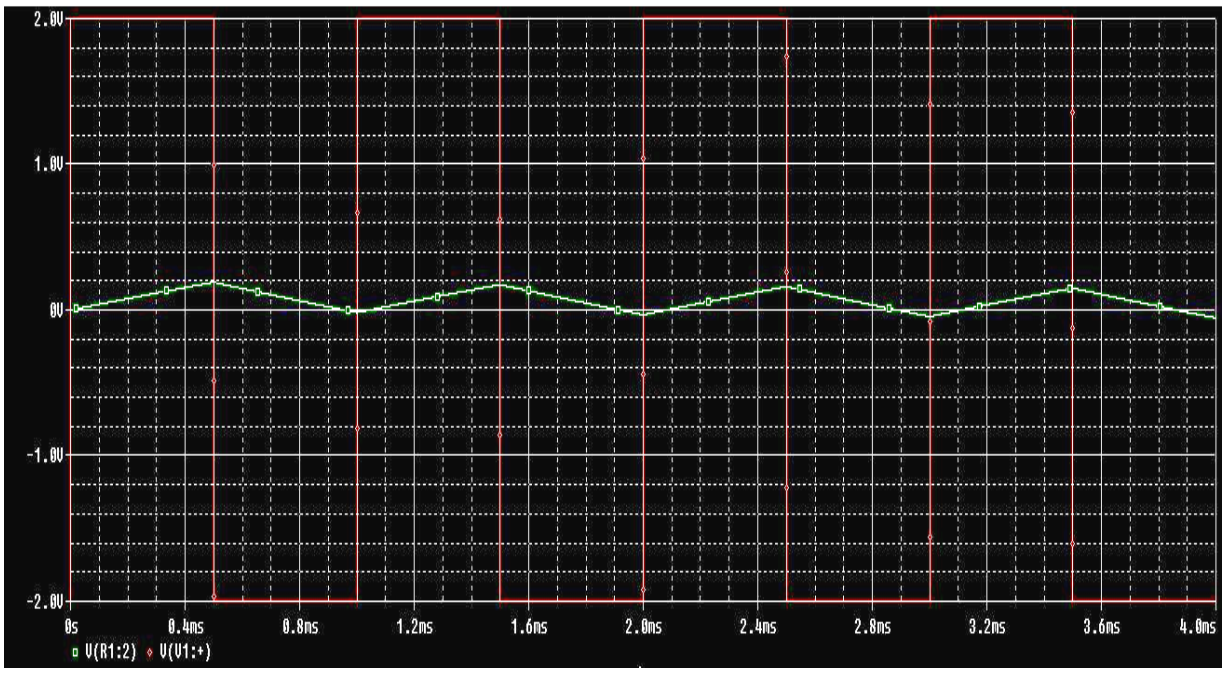
Pulse width = τ /10 = RC / 10

3. Compare and Draw the relation between the output and input voltages.
4. Comment on your results.
5. Assignment: Prepare an ORCAD lab report for the RC integrator and differentiator circuits.

Using ORCAD



ORCAD results



Next Lab: *RC Differentiator Circuit*