

Electric Circuits II – Laboratory 01

RC circuit analysis

#	Student ID	Student Name	Grade (10)	Instructor signature
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Delivery Date	
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Objective

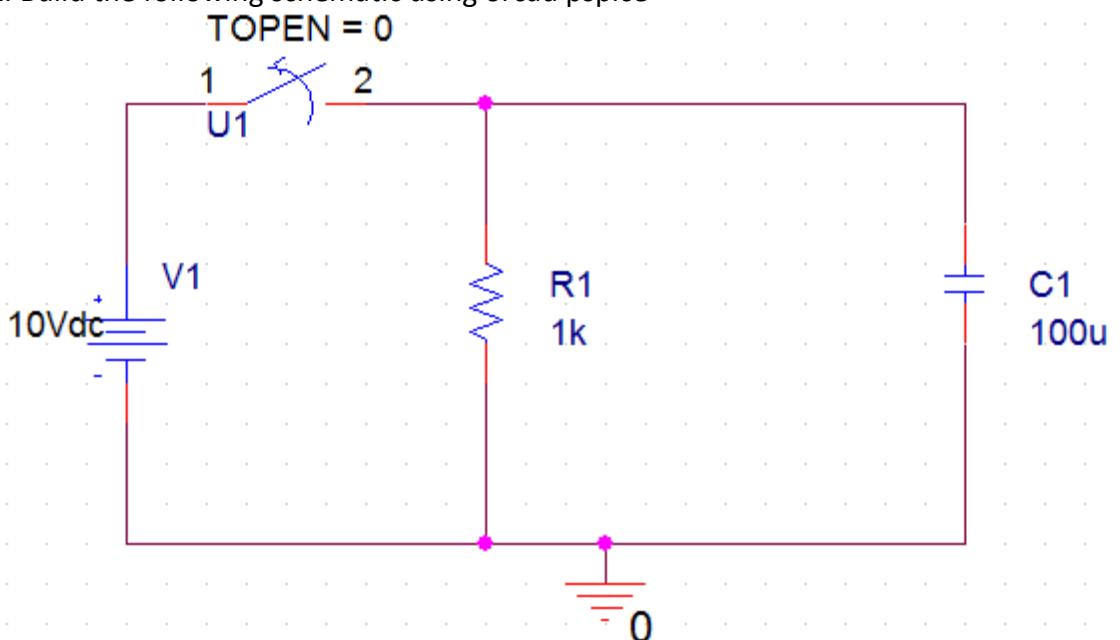
In this exercise, the DC steady state response of simple RC circuits are examined. The transient behavior of RC circuits is also tested.

Theory Overview

The DC steady state response of RC circuits are essential opposite of each other: that is, once steady state is reached, capacitors behave as open circuits while inductors behave as short circuits. In practicality, steady state is reached after five time constants. The time constant for an RC circuit is simply the effective capacitance times the effective resistance, $\tau = RC$.

Procedure

1. Build the following schematic using orcad pspice



2. You can find switch on EVAL library named SW_tOpen
3. Use time domain transient in simulation profile, set the runtime to 6 seconds
4. Run simulation then plot the relation between $V(C1:2)-V(C1:1)$ and time

Results and data analysis

τ	
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$VC(\tau)$ simulated	
$VC(\tau)$ calculated	
Deviation	

Time (sec)	Vc
0.0	
0.2	
0.4	
0.6	
0.8	
1.0	
1.2	
1.4	
1.6	
1.8	
2.0	
2.2	
2.4	
2.6	
2.8	
3.0	
3.2	
3.4	
3.6	



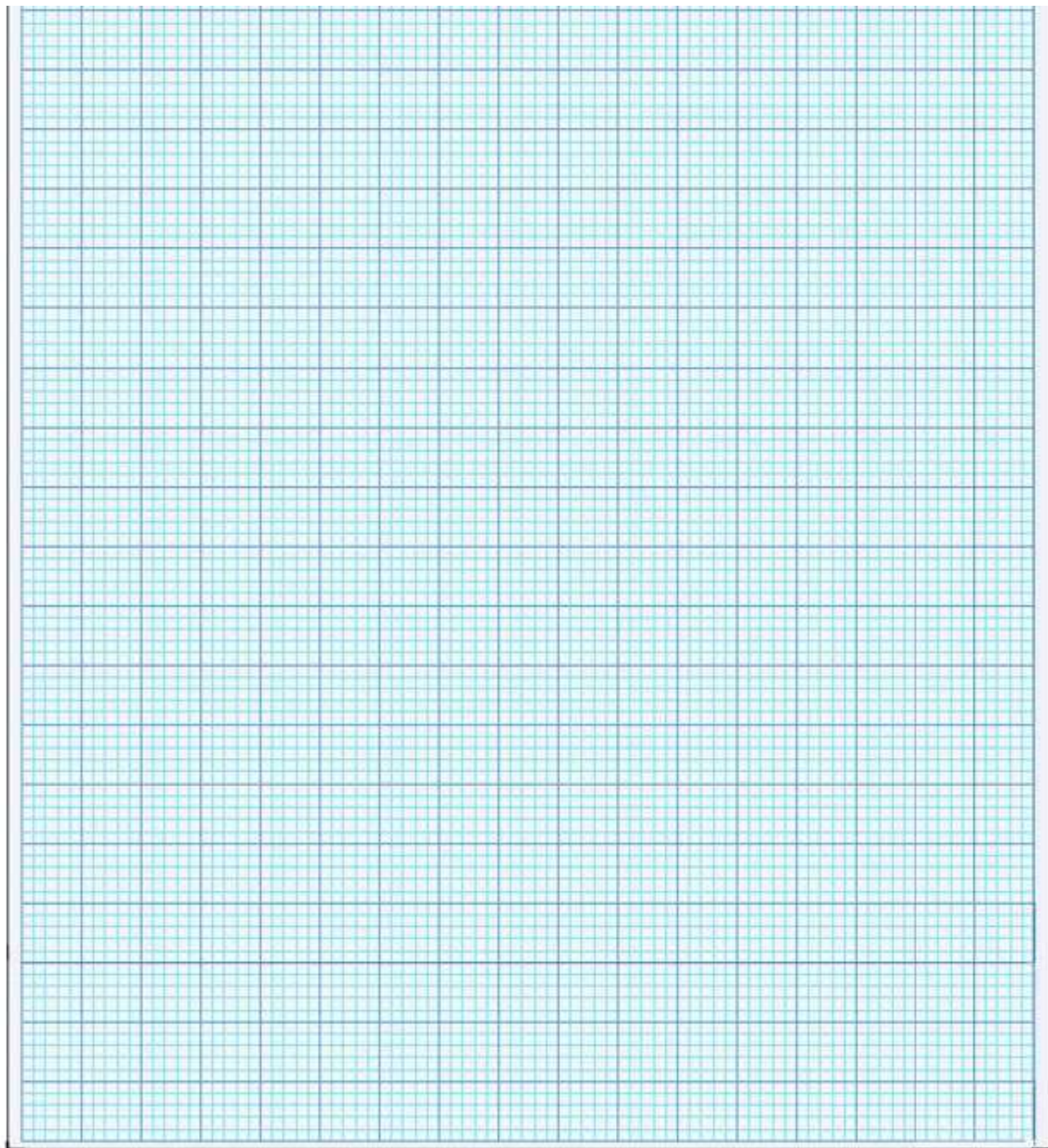
كلية الهندسة

Faculty of Engineering



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3.8	
4.0	
4.2	
4.4	
4.6	
4.8	
5.0	
5.2	
5.4	
5.6	
5.8	
6.0	



Questions and Conclusions

1. What is a reasonable approximation for a capacitor at DC steady state?

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2. How can a reasonable approximation for time-to-steady state of an RC circuit be computed?

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3. In general, what sorts of shapes do the discharge voltages of DC RC circuits follow?

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