

**Birzeit University**  
**Physics 112**

Experiment #7

**Damped Oscillations**

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**Section:** 6

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## **Abstract:**

- **The aim:** to find the maximum level for **R** to stay in Over damping stage, and found **t**  $\frac{1}{2}$  for over damping.
- **The method:** by finding the **time** and **R** using **DCO** by measure the voltage int the circuits.
- **The main Result:**

1- Over damping:

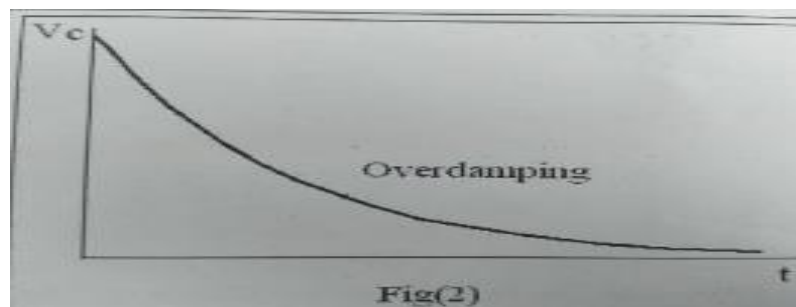
2- Critical damping:

3- Under damping:

## Introduction:

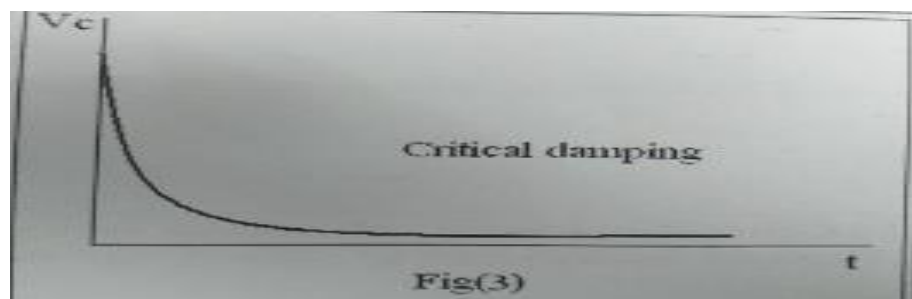
- **Over damping:**

It was both terms in equation decay exponentially with  $t$  and the  $V$  across the capacitor it be over-damped, the figure show it.



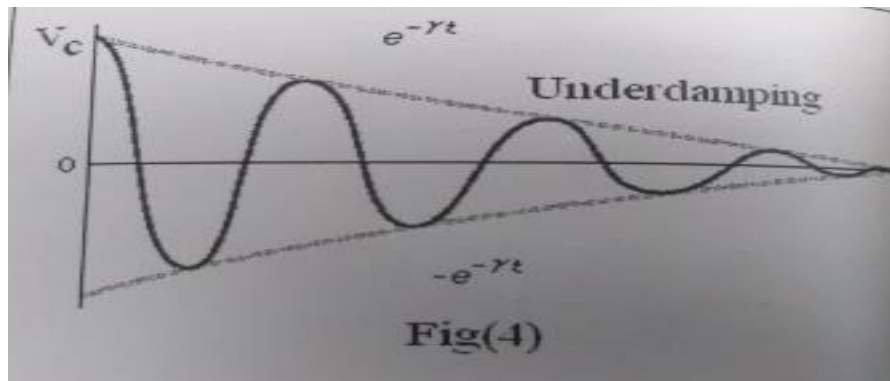
- **Critical damping:**

We can see in the figure below, the charge on the capacitor plates and consequently the voltage across the capacitor takes many forms, the charge on the capacitor plates, and consequently the voltage across them.



- **Under damping:**

In this case the time at which the amplitude falls to half the initial value  $t_{1/2}$ , as described in the figure below.



## **Results and Conclusion:**

In this experiment the three damping stages occurs are have different range of  $R$ , first it begins with the underdamping stage, then at a specific value of  $R$  we reach the critical damping stag, finally, we get to the overdamping stage for all larger values of  $R$ .

When you calculate the  $t_{1/2}$  for these three damping stages Over, Critical and Under the value experimentally and theoretically differed by a very small amount because they have many of errors in measure.