

EE 205 Circuit Theory

Lab 8

RLC Circuit Underdamped Response

Procedure:

Consider the RLC circuit shown in Fig.1 with $C=8.2\text{nF}$, $R=10\text{k}$ and $L=4.6\mu\text{H}$. Use a square wave source signal with 10V peak-to-peak and 5V offset at 1kHz frequency.

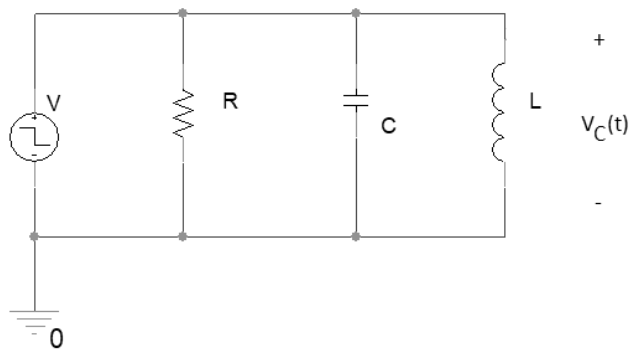


Fig.1. RLC Circuit

Connect an oscilloscope probe to $V_C(t)$. You may use “autoset” to view the output on the scope screen. Since this circuit is underdamped, you should observe a damped oscillation. Measure the oscillation frequency. Fill Table 1 with the measured and calculated values.

Note that

$$\alpha = \frac{1}{2RC}$$

$$\omega_0 = \frac{1}{\sqrt{LC}}$$

and

$$\omega_d = \sqrt{\omega_0^2 - \alpha^2}$$

Table 1. Calculated and Measured Values

Calculated Values				Measured Values	
α (Damping factor)	ω_0 (resonant frequency)	ω_d (Damped radian frequency)	Damping time ($\sim 5\alpha$)	ω_d	Damping time