



First Order RLC Circuits: Time Domain Analysis

An Online Continuing Education Course for Engineers

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First Order RLC Circuits: Time Domain Analysis
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1 Preface

1.1 Purpose and Intended Audience

This lesson is a refresher in basic network analysis of passive RLC circuits using discrete passive (**R**) resistor, (**L**) inductor and (**C**) capacitor components. The complete response for each of the 4 basic circuits has transient and steady state responses.

This course covers RC high and low-pass, and RL high and low-pass circuits (first order circuits). We'll obtain the complete response using time domain analysis. Time domain network analysis uses linear, integral and differential equations for voltage and current characteristics of the devices and the overall circuit.

The intended audience is practicing electrical and electronics engineers or second year college level electrical engineering students. The focus is not so much on the mathematics but on electrical engineering concepts, having the necessary math skills as a foundation for rapid and accurate circuit analysis.

1.2 Navigation

Suggestions for navigating this course:

- ◆ The [TOC](#) link at the top of each page brings you up to the Table of Contents of this document.
- ◆ Navigable links are in bold blue-colored font
- ◆ Use the back button if from Microsoft Word or Adobe Reader
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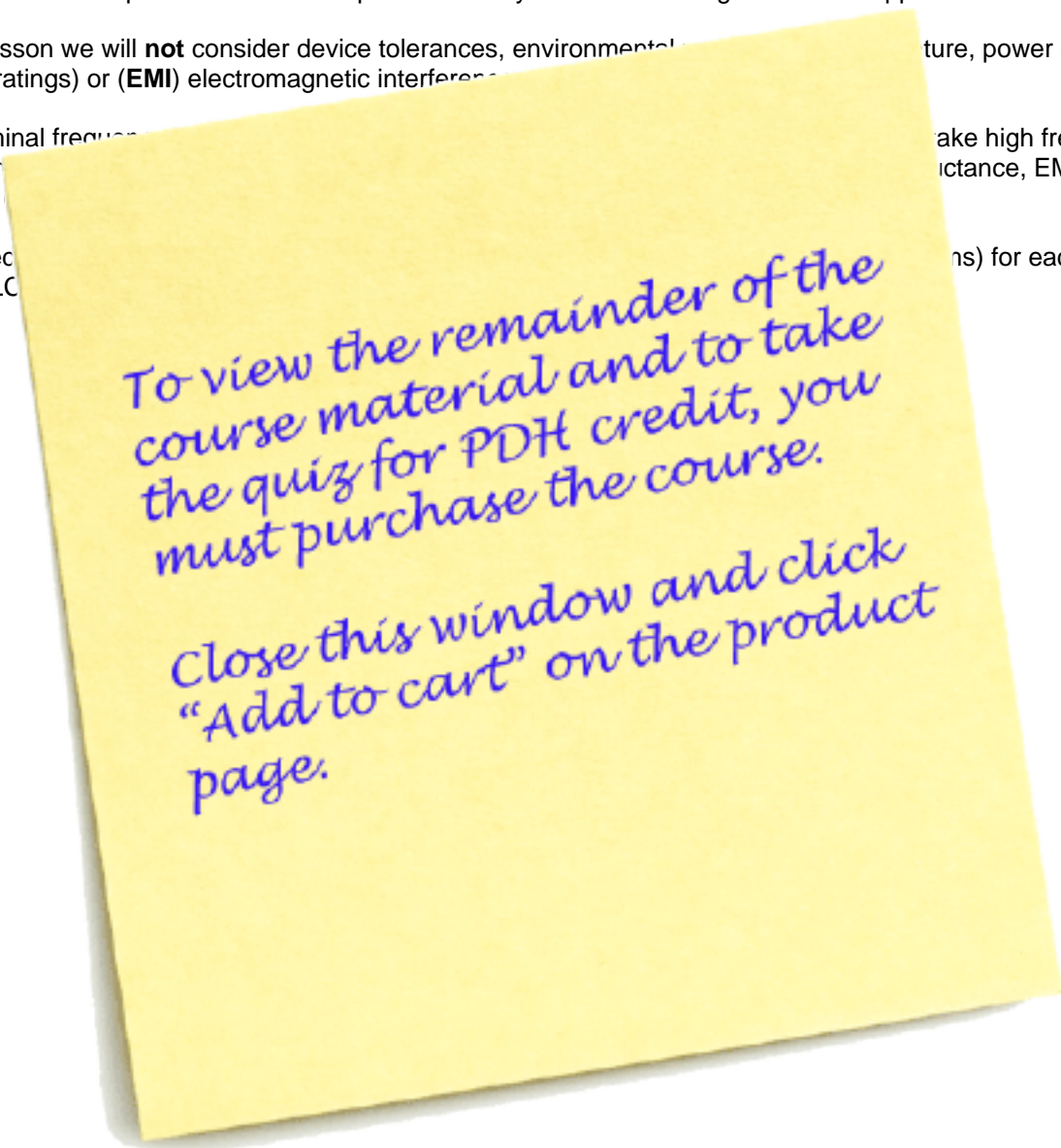
2 Introduction

Passive discrete electronic components used in signal conditioning / generation are the resistor (R), inductor (L) and capacitor (C). Passive discrete components are stand-alone packaged devices whose physical characteristics and parameters are independent of any sources of voltage or current applied to them.

In this lesson we will **not** consider device tolerances, environmental conditions (temperature, power or working voltage ratings) or **(EMI)** electromagnetic interference.

The nominal frequency range of the components is from 0 Hz to 100 MHz. We will not take high frequency effects in parasitic inductance and capacitance, EMI, and physical effects into account.

Our objective is to design a circuit that meets the following specifications (ns) for each of 4 first order RLC circuits.



To view the remainder of the course material and to take the quiz for PDH credit, you must purchase the course.

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