



This lit bulb is part of an AC circuit. The coil of wire in the background would have no effect on a DC circuit, but is a key component of an AC circuit. It is called an “inductor.”

# AC CIRCUITS

Physics 241/261

Fall 2015

## 1 Introduction

In this lab, we will conclude our study of Alternating Current (AC) electricity by looking in detail at how circuits behave when an AC voltage is applied. The previous labs have taught us that AC is the natural choice for easy power generation and transmission. Therefore, it is important to understand how various types of circuit elements behave in the AC mode.

For our purposes, circuit elements can broadly be classified into three ideal devices: resistors, capacitors, and inductors, denoted by  $R$ ,  $C$ , and  $L$  respectively. Many real-world devices can be modeled as combinations of these. Electric motors, for instance, are mostly inductive in nature, with a non-negligible amount of internal resistance; we can model this as a series combination of an inductor and a resistor. Your toaster oven, on the other hand, is almost completely resistive and can be modeled simply as a resistor. Finally, a radio has a tuning circuit that is inductive and capacitive. When you turn to a specific station, you are varying a capacitor in the radio tuning circuit so that it is in resonance with the broadcast frequency of the station.

An important property of resistors is that if an alternating current flows through them, the voltage drop across them is proportional to the current. In Sections 5-7 you will discover that this is *not* true for capacitors and inductors; while the voltage drop is still a sine wave, it is *phase shifted* relative to the current. To better understand the behavior of the AC circuits, we will be using **phasors** to represent voltages and currents. While some textbooks may contain a definition of phasors, the discussion of their use is typically limited, so we have included a discussion of their use in Section 2 (note also that conventions may vary between textbooks.)

Many systems have a “natural” frequency at which they tend to oscillate. Examples you have

# Ac Circuits Lab Manual

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## Ac Circuits Lab Manual:

**AC Circuits Lab Manual** Wayne M. Hope, 2001-01-01      **Modern Elements of Dc/Ac Circuits-Lab Manual Solutions Mnl** Antonakos, 2007-06      *Electronics Fundamentals* Richard Jinbo, Lois Fouse, 2000      *AC Electrical Circuits* James Fiore, 2014-01-13 This laboratory manual features a total of 15 experiments in the field of AC electrical circuit analysis. It begins with basic RL and RC operation and progresses through phasors to AC series parallel and series parallel circuit configurations. It also includes experiments focusing on the superposition technique, Thevenin's Theorem, maximum power transfer, and series and parallel resonance. An introductory oscilloscope exercise is included using either a two or four channel digital oscilloscope. Each experiment includes a theory overview, electrical component parts list, and test equipment inventory. Most exercises may be completed with just a digital multimeter, two channel oscilloscope, and an AC function generator. This is the print version of the online Open Educational Resource.      *PC Lab, DC and AC Circuits* Gregory J. McMillan, 1991      **Spl** Terrell, 2000-10      Lab Manual to Accompany Dc/ac Circuits and Electronics Kevin Taylor, 2003      EduGorilla's CBSE Class 12th Chemistry Lab Manual | 2024 Edition | A Well Illustrated, Complete Lab Activity book with Separate FAQs for Viva Voce Examination EduGorilla Prep Experts,      *Engineering Practices Lab Manual - 5th E T* Jeyapoovan Nadar, Engineering Practices Lab Manual covers all the basic engineering lab practices in the Civil, Mechanical, Electrical, and Electronics areas. The manual details the various tools to be used and exercises to be practiced in the application of engineering practices in each field.      Laboratory Manual for Introductory Electronics Experiments L. K. Maheshwari, M. M. S. Anand, 1979      *AC Circuits* Nida Corporation, 1991      ELECTRONICS LAB MANUAL Volume I, FIFTH EDITION NAVAS, K. A., 2015-09-11 This lab manual is intended to support the students of undergraduate engineering in the related fields of electronics engineering for practicing laboratory experiments. It will also be useful to the undergraduate students of electrical science branches of engineering and applied science. This book begins with an introduction to the electronic components and equipment and the experiments for electronics workshop. Further, it covers experiments for basic electronics lab, electronic circuits lab, and digital electronics lab. A separate chapter is devoted to the simulation of electronics experiments using PSpice. Each experiment has aim, components and equipment required, theory, circuit diagram, tables, graphs, alternate circuits, answered questions, and troubleshooting techniques. Answered viva voce questions and solved examination questions given at the end of each experiment will be very helpful for the students. The purpose of the experiments described here is to acquaint the students with Analog and digital devices, Design of circuits, Instruments, and procedures for electronic test and measurement.      Introductory DC/AC Circuits Nigel P. Cook, 2005 B This time honored book, now in its sixth edition, improves on its charter to offer comprehensive and current coverage of DC, AC, electronics, and Semiconductor Devices and Circuits, along with all prerequisite mathematics, in a learner-friendly, easily accessible format. The presentation includes many chapter opening and margin timelines, component type tables, circuit analysis tables.

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