

# PSpice™ based Laboratory USER MANUAL

Department of Electrical and Computer Engineering  
University of Minnesota

Lab Manual version 2008

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Simplified using PSpice™ (Release 9)": <http://www.mnpere.com>]

# Pspice Lab Manual

**Robert L. Boylestad**



## **Pspice Lab Manual:**

*LABORATORY EXPERIMENTS AND PSPICE SIMULATIONS IN ANALOG ELECTRONICS* L. K. MAHESHWARI, M. M. S. ANAND, 2006-01-01 This laboratory manual for students of Electronics Electrical Instrumentation Communication and Computer engineering disciplines has been prepared in the form of a standalone text offering the necessary theory and circuit diagrams with each experiment Procedures for setting up the circuits and measuring and evaluating their performance are designed to support the material of the authors book Analog Electronics also published by PHI Learning There are twenty five experiments The experiments cover the basic transistor circuits the linear op amp circuits the active filters the non linear op amp circuits the signal generators the voltage regulators the power amplifiers the high frequency amplifiers and the data converters In addition to the hands on experiments using traditional test equipment and components this manual describes the simulation of circuits using PSPICE as well For PSPICE simulation any available standard SPICE software may be used including the latest version OrCAD V10 Demo software This feature allows the instructor to adopt a single laboratory manual for both types of experiments

*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

*PSpice for Circuit Theory and Electronic Devices* Paul Tobin, 2007 PSpice for Circuit Theory and Electronic Devices is one of a series of five PSpice books and introduces the latest Cadence Orcad PSpice version 10.5 by simulating a range of DC and AC exercises It is aimed primarily at those wishing to get up to speed with this version but will be of use to high school students undergraduate students and of course lecturers Circuit theorems are applied to a range of circuits and the calculations by hand after analysis are then compared to the simulated results The Laplace transform and the s plane are used to analyze CR and LR circuits where transient signals are involved Here the Probe output graphs demonstrate what a great learning tool PSpice is by providing the reader with a visual verification of any theoretical calculations Series and parallel tuned resonant circuits are investigated where the difficult concepts of dynamic impedance and selectivity are best understood by sweeping different circuit parameters through a range

of values Obtaining semiconductor device characteristics as a laboratory exercise has fallen out of favour of late but nevertheless is still a useful exercise for understanding or modelling semiconductor devices Inverting and non inverting operational amplifiers characteristics such as gain bandwidth are investigated and we will see the dependency of bandwidth on the gain using the performance analysis facility Power amplifiers are examined where PSpice Probe demonstrates very nicely the problems of cross over distortion and other problems associated with power transistors We examine power supplies and the problems of regulation ground bounce and power factor correction Lastly we look at MOSFET device characteristics and show how these devices are used to form basic CMOS logic gates such as NAND and NOR gates

*Laboratory Manual for Pulse-Width Modulated DC-DC Power Converters* Marian K. Kazimierczuk, Agasthya Ayachit, 2015-08-13 Designed to complement a range of power electronics study resources this unique lab manual helps students to gain a deep understanding of the operation modeling analysis design and performance of pulse width modulated PWM DC DC power converters Exercises focus on three essential areas of power electronics open loop power stages small signal modeling design of feedback loops and PWM DC DC converter control schemes and semiconductor devices such as silicon silicon carbide and gallium nitride Meeting the standards required by industrial employers the lab manual combines programming language with a simulation tool designed for proficiency in the theoretical and practical concepts Students and instructors can choose from an extensive list of topics involving simulations on MATLAB SABER or SPICE based platforms enabling readers to gain the most out of the prelab inlab and postlab activities The laboratory exercises have been taught and continuously improved for over 25 years by Marian K Kazimierczuk thanks to constructive student feedback and valuable suggestions on possible workroom improvements This up to date and informative teaching material is now available for the benefit of a wide audience Key features Includes complete designs to give students a quick overview of the converters their characteristics and fundamental analysis of operation Compatible with any programming tool MATLAB Mathematica or Maple and any circuit simulation tool PSpice LTSpice Synopsys SABER PLECS etc Quick design section enables students and instructors to verify their design methodology for instant simulations Presents lab exercises based on the most recent advancements in power electronics including multiple output power converters modeling current and voltage mode control schemes and power semiconductor devices Provides comprehensive appendices to aid basic understanding of the fundamental circuits programming and simulation tools Contains a quick component selection list of power MOSFETs and diodes together with their ratings important specifications and Spice models **PSpice and Circuit Analysis** John L. Keown, 1991 *Lab Manual for Electronics* Martin Feldman, 2001-11 The emphasis is first on understanding the characteristics of basic circuits including resistors capacitors diodes and bipolar and field effect transistors The readers then use this understanding to construct more complex circuits such as power supplies differential amplifiers tuned circuit amplifiers a transistor curve tracer and a digital voltmeter In addition readers are exposed to special topics of current

interest such as the propagation and detection of signals through fiber optics the use of Van der Pauw patterns for precise linewidth measurements and high gain amplifiers based on active loads

**KEY TOPICS** Chapter topics include Thevenin s Theorem Resistive Voltage Division Silicon Diodes Resistor Capacitor Circuits Half Wave Rectifiers DC Power Supplies Diode Applications Bipolar Transistors Field Effect Transistors Characterization of Op Amp Circuits Transistor Curve Tracer Introduction to PSPICE and AC Voltage Dividers Characterization and Design of Emitter and Source Followers Characterization and Design of an AC Variable Gain Amplifier Design of Test Circuits for BJT s and FET s and Design of FET Ring Oscillators Design and Characterization of Emitter Coupled Transistor Pairs Tuned Amplifier and Oscillator Design of Am Radio Frequency Transmitter and Receiver Design of Oscillators Using Op Amps Current Mirrors and Active Loads Sheet Resistance Design of Analog Fiber Optic Transmission System Digital Voltmeter

The Illustrated Guide to PSpice Robert Lamey,1995 Based on the latest version of the software DOS Version 6 this book introduces users to the popular PSpice circuit analysis software program Each feature of circuit analysis and each feature of the PSpice software is clearly presented and illustrated by an example putting electronics technicians and professional engineers on the fast track to increased productivity An introductory chapter on how to load and configure the PSpice program is also included for those who are new to network analysis or new to using computers

**Laboratory Manual for Electronic Circuits - 1** Murat AKSOY,2018-10-31

Schematic Capture with MicroSim PSpice Marc E. Herniter,1996 This book provides comprehensive coverage of the current knowledge on the most innovative systematic and multidisciplinary approaches to the treatment of patients with cancer Each chapter provides a description of a specific method for cancer management

**The Electronics Handbook** Jerry C. Whitaker,1996-12-23 The superb organization of The Electronics Handbook means that it is not only a comprehensive and fascinating reference but also a pleasure to use Some of these organizational features include

*Circuit Analysis* Allan Robbins,Wilhelm C. Miller,2000 The mathematical foundation and the practical application of circuit theory in this highly readable book will prove invaluable to students enrolled in electronics engineeringtechnology curriculum and professionals alike This one of a kind text provides comprehensive coverage of circuit analysis topics including fundamentals of DC and AC circuits methods of analysis capacitance inductance magnetism simple transients and computer methods Hundreds of step by step examples lead the user through the critical thinking processes required to solve problems Two popular computer simulation packages OrCAD PSpice Version 9 and Electronics Workbench are integrated throughout the book to support what if situations With the Online Companion users can access a web site that contains RealAudio sound clips that present more in depth discussions of the most difficult topics covered in each chapter

*Laboratory Manual for Introductory Circuit Analysis* Robert L. Boylestad,Gabriel Kousourou,2010

Schematic Capture with PSpice Marc E. Herniter,1994

Electronic Devices and Circuit Theory Lab Manual (Pspice Emphasis) Boylestad,Louis Nashelsky,Franz Monssen,2005-04

Principles of Electric Circuits Thomas L. Floyd,2000 CD ROM includes 100 EWB circuits for the

textbook s troubleshooting and analysis problems demonstration version of EWB version 5 X software and a full student version of EWB version 5 X available for purchase Preface *Lab Manual for Introductory Circuit Analysis* Robert L. Boylestad, Gabriel Kousourou, 2015-07-09 The primary objectives of this revision of the laboratory manual include insuring that the procedures are clear that the results clearly support the theory and that the laboratory experience results in a level of confidence in the use of the testing equipment commonly found in the industrial environment For those curriculums devoted to a dc analysis one semester and an ac analysis the following semester there are more experiments for each subject than can be covered in a single semester The result is the opportunity to pick and choose those experiments that are more closely related to the curriculum of the college or university All of the experiments have been run and tested during the 13 editions of the text with changes made as needed The result is a set of laboratory experiments that should have each step clearly defined and results that closely match the theoretical solutions Two experiments were added to the ac section to provide the opportunity to make measurements that were not included in the original set Developed by Professor David Krispinsky of Rochester Institute of Technology they match the same format of the current laboratory experiments and cover the material clearly and concisely All the experiments are designed to be completed in a two or three hour laboratory session In most cases the write up is work to be completed between laboratory sessions Most institutions begin the laboratory session with a brief introduction to the theory to be substantiated and the use of any new equipment to be used in the session

**Experiments in Basic Circuits** David M. Buchla, 2007      **SPICE for Power Electronics and Electric Power**

Muhammad H. Rashid, 2017-12-19 Power electronics can be a difficult course for students to understand and for professors to teach Simplifying the process for both SPICE for Power Electronics and Electric Power Third Edition illustrates methods of integrating industry standard SPICE software for design verification and as a theoretical laboratory bench Helpful PSpice Software and Program Files Available for Download Based on the author Muhammad H Rashid s considerable experience merging design content and SPICE into a power electronics course this vastly improved and updated edition focuses on helping readers integrate the SPICE simulator with a minimum amount of time and effort Giving users a better understanding of the operation of a power electronics circuit the author explores the transient behavior of current and voltage waveforms for each and every circuit element at every stage The book also includes examples of all types of power converters as well as circuits with linear and nonlinear inductors New in this edition Student learning outcomes SLOs listed at the start of each chapter Changes to run on OrCAD version 9 2 Added VPRINT1 and IPRINT1 commands and examples Notes that identify important concepts Examples illustrating EVALUE GVALUE ETABLE GTABLE ELAPLACE GLAPLACE EFREQ and GFREQ Mathematical relations for expected outcomes where appropriate The Fourier series of the output voltages for rectifiers and inverters PSpice simulations of DC link inverters and AC voltage controllers with PWM control This book demonstrates techniques of executing power conversions and ensuring the quality of the output waveforms rather than

the accurate modeling of power semiconductor devices This approach benefits students enabling them to compare classroom results obtained with simple switch models of devices In addition a new chapter covers multi level converters Assuming no prior knowledge of SPICE or PSpice simulation the text provides detailed step by step instructions on how to draw a schematic of a circuit execute simulations and view or plot the output results It also includes suggestions for laboratory experiments and design problems that can be used for student homework assignments     *Introduction to Modern Power Electronics* Andrzej M. Trzynadlowski, 2010-03-15 This updated edition of this book provides comprehensive coverage of modern power electronics addressing all the latest trends and hot button issues from PWM rectifiers to renewable energy systems to electromagnetic interference It features an overview of advanced control methods used in today s power electronic converters numerous SPICE files of typical power conversion circuits and an Instructor s Manual with solutions to all problems An extensive body of examples exercises computer assignments and simulations make     Introductory Circuit Analysis Robert L. Boylestad, 2000 The accompanying CD ROM includes EWB circuits rendered in Electronics Workbench a limited demonstration of Electronics Workbench and a full student version of EWB 5 X

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