



Electric Circuit Analysis

By Charles J. Monier

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This book establishes a clear relationship between the basic principles of electric circuit analysis and the problem-solving procedures for analyzing electric currents. It contains traditional topics in electric circuit analysis along with: matrix methods for solving systems of algebraic equations for simultaneous solutions, derivatives and integrals, differential equations, and Laplace transformers. Chapter titles Ohm's Law and Resistance; Kirchhoff's Laws and Resistor Combinations; Basic Analysis Tools; Numerical Methods; Multi-Loop Circuits; Network Theorems; The Operational Amplifier and Basic Measuring Devices; Capacitors; Inductors; Mathematics for ac Circuits; Network Theorems Applied to ac Circuits; Two Port Networks; and Three Phase Circuits. A reference for professionals in technology related industries.

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Editorial Review

From the Inside Flap
Preface

The material presented in this textbook is intended to establish a clear relationship between the basic principles of electric circuit analysis and the problem-solving procedures for analyzing electric circuits. Although the material is presented with a reasonable amount of mathematical rigor, the reader needs no more than a working knowledge of algebra and trigonometry to benefit from the textbook. Clarity, conciseness, completeness, and, above all, readability are intended as the major characteristics of this textbook.

Each chapter of the textbook contains an abundance of examples with varying degrees of difficulty to illustrate the problem-solving procedures. Exercises are provided at the end of each chapter to allow the student to complete the learning process by applying the newly learned material. The exercises and examples are designed to promote analytical reasoning and improve the student's problem-solving ability. The examples are very detailed and should be treated as an integral part of the text material.

Electric circuit analysis is one of the first courses of study required in electrical engineering technology programs, and a complete mastery of the material is a prerequisite for the electrical courses that follow. This text provides material for a traditional two-semester course of study in dc and ac circuit analysis along with many advanced topics. The text is designed to allow the engineering technology student to complete the required work in electric circuit analysis as early as possible in his or her academic career with a minimum of prerequisites.

In addition to the topics that are traditionally included in electric circuit-analysis textbooks at the technology level, matrix methods for solving systems of algebraic equations for simultaneous solutions, derivatives and integrals, differential equations, and Laplace transforms are also included. Matrix methods are included to enhance the multiloop circuit-analysis methods. Derivatives and integrals are included to increase the student's understanding of and ability to analyze circuits containing inductors and capacitors. Differential equations are introduced to facilitate the study of transients in electric circuits. Laplace transforms are introduced to enable the student to solve electric circuit problems by using simple algebraic techniques.

The matrix methods, derivatives and integrals, the methods for solving differential equations, and Laplace transforms are presented from a conceptual viewpoint with emphasis on methodology and provide the student with the mathematical concepts necessary for proceeding with the study of electric circuits in a meaningful manner. Although mathematics courses scheduled later in the student's academic program will extend and enhance the mathematical concepts presented in this text, the student needs to know many of these concepts, at least from a procedural viewpoint, while enrolled in electric circuit-analysis courses.

Because this textbook is primarily concerned with the student developing an understanding of the basic principles of electric circuits and the related problem-solving procedures, computer programs for the analysis and design of electric circuits are not included. This is in no way meant to diminish the vast potential of the digital computer for analyzing and designing electric circuits. Computer software packages such as PSPICE are presently in widespread use, and software packages of this type should be an integral part of the student's training. However, the author has found that teaching the principles of electric circuits and related problem-solving procedures separate from computer methods leads to a better understanding of the principles of electric circuit analysis. Ideally, the principles and problem-solving procedures are presented in lecture

courses, which are accompanied by laboratory courses where the software packages are presented along with the usual laboratory experiments. A short demonstration on the use of PSPICE to analyze electric circuits is presented in Appendix A.

The textbook is intended for two three-semester-hour lecture courses. The recommended coverage for the first course is Chapters 1 through 15, and for the second course, Chapters 16 through 23. Chapter 15 is placed immediately after Chapters 12, 13, and 14, because it relates so well to those chapters. However, Chapter 15 can be delayed until the second course and covered prior to Chapter 21 without any loss of continuity. ACKNOWLEDGMENTS

I wish to thank my colleagues at Nicholls State University, particularly, Professors Badiollah Asrabodi, Donald M. Bardwell, R. J. Yakupzack, and Professor Emeritus Glenn R. Swetman for their valuable assistance. Senior student David P. Sanchez also deserves my thanks for assisting me with the exercise problems. I would like to thank the following reviewers: George Fredericks, Northeast State TCC; Kenneth Reid, Indiana University/Purdue University Indianapolis (IUPUI); and Sohail Anwar, Penn State University, Altoona College: I also wish to express my deepest appreciation to my wife, Lora Jane, for typing and editing this manuscript.

Charles J. Monier

From the Back Cover

Charles Monier, professor at Nicholls State University, approaches the topic of DC/AC Circuit Analysis in a new way.

The text shows students how to analyze more complex circuits without requiring calculus. This allows technology students to understand more elaborate circuits that they may face in the workplace.

The text includes a brief Pspice Version 9.0 tutorial to help students use this powerful circuit analysis tool in the Laboratory.

Step-by-step summaries are found in each chapter to aid student comprehension of circuit analysis theories presented in the text.

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Charles J. Monier

Users Review

From reader reviews:

Craig Baker:

This Electric Circuit Analysis book is simply not ordinary book, you have it then the world is in your hands. The benefit you receive by reading this book is usually information inside this book incredible fresh, you will get facts which is getting deeper anyone read a lot of information you will get. This specific Electric Circuit Analysis without we realize teach the one who reading through it become critical in considering and analyzing. Don't end up being worry Electric Circuit Analysis can bring any time you are and not make your case space or bookshelves' come to be full because you can have it in the lovely laptop even mobile phone. This Electric Circuit Analysis having very good arrangement in word and layout, so you will not feel uninterested in reading.

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