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The Analysis and Design of Linear Circuits, 7th Edition

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📖 DESCRIPTION

As an introduction to the analysis, design, and evaluation of Electric Circuits, this text focuses on developing the student's design intuition and emphasizes the use of computers to assist in design and evaluation. Early introduction to circuit design motivates the student to create circuit solutions and optimize designs based on real-world constraints. Thomas/Rosa/Toussaint covers three major blocks in sixteen chapters. Chapters 1-4 cover dc circuits including dependent sources, the ideal Op Amp, and interface design. Chapters 5-12 cover ac circuits using both the traditional Phasor approach and a more efficient Laplace-early approach to include a signals chapter and transient and frequency responses in both the time and frequency domains. The last block deals with applications and extensions of the first two blocks covering Fourier Analysis (Ch 13), multipole active filters (Ch 14), coupled coils and transformers (Ch 15), ac power systems (Ch 16), and two-port networks (Ch 17). The text has over 350 worked examples followed by 422 exercises. Over a thousand homework problems ranging from elementary to complex are structured around a sequence of carefully defined learning objectives based on Bloom's Taxonomy. This edition emphasizes computer-based analysis and design by expanding the number of examples, exercises, and problems using software for mathematical computation and circuit simulation.

⬙ ABOUT THE AUTHOR

Roland E. Thomas is the author of *The Analysis and Design of Linear Circuits*, 7th Edition, published by Wiley.

Albert J. Rosa is the author of *The Analysis and Design of Linear Circuits*, 7th Edition, published by Wiley.

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NEW TO EDITION

- **Continued emphasis on the use of computer tools to solve problems** - Examples, exercises and homework problems that emphasize MATLAB and OrCAD/PSPICE.

- **Solutions/Problems:** Adds more skill-building examples, exercises, and associated homework problems, which enable students to gain confidence prior to tackling more challenging problems. Specific topics emphasized include: Thévenin Equivalent Circuits, Nodal and Mesh Analysis, Op-Amp Circuits, and Phasor Analysis. Solutions Manual now includes more detailed solution steps in addition to MATLAB code.

- **Exercise Solutions:** All exercises now provide detailed solutions on the Student Web site.

- **New web-based Appendix C:** An extensive appendix on Software Tools is organized by text chapter and discusses how to apply MATLAB and/or OrCAD to the solution of problems found in that chapter. Numerous problems are solved in detail using software tools. In several chapters some peculiarities of MATLAB and OrCAD software relative to the topics being studied are discussed. This appendix is referred to by the appropriate sections of the text.

- **Improved Solutions Manual:** Now includes worked-out solutions showing key intermediate steps with MATLAB solutions added where appropriate.

- **Instructors Manual:** Includes detailed guidance on relating learning objectives to ABET accreditation requirements.

- **Two-Port Networks:** Previously web-based, Chapter 17 on two-port networks is now in the printed text.

📖 FEATURES

• **Early introduction to design and design evaluation:** Design serves to motivate students since students generally go into engineering wanting to create things. Design evaluation helps students choose between competing design solutions, often based on realistic constraints. There are 52 design and 17 evaluation examples in this edition.   There are also 215 design and 54 evaluation homework problems.

- **Extensive use of Laplace for ac circuits:** Proven experience that students learn ac circuit analysis better with Laplace than with a more traditional Phasor approach. Those wanting to use the traditional Phasor First approach can do so by simply following the text as organized. Those wanting to use the Laplace Early approach can do so by skipping Ch 8 and returning to it after Laplace is introduced in Ch 9 and linked to Phasors in Ch 11.

- **Extensive integration of software tools (MATLAB, OrCAD, Excel):** In tune with today's computer-literate student, more opportunity is given to check designs, conduct "what-ifs", visualize specifications, compare results and tackle more complex problems than with hand or calculator-based solutions.

- **Realistic problems and applications:** Numerous Examples, Exercises, and homework problems use realistic values of components and their limitations. Furthermore, 29 application examples link concepts to real engineering solutions.

- **ABET-friendly topics and organization:** Numerous features help meet accreditation requirements such as:
  Design and Evaluation - Criterion 3(c) – an ability to design a system to meet desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
  Software tools - Criterion 3(k) – an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Behaviorally motivated objectives - Criterion 4 – an assessment and evaluation process periodically documents and demonstrates the degree to which the program outcomes are attained.

- **Detailed lecture outlines available to instructors for all Chapters:** Provides instructors with structured, integrated lesson plans that follow the development of material in the text. Enables instructors to quickly adopt the text and be proficient in the classroom with meaningful teaching aids, extra example problems, and discussion topics

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