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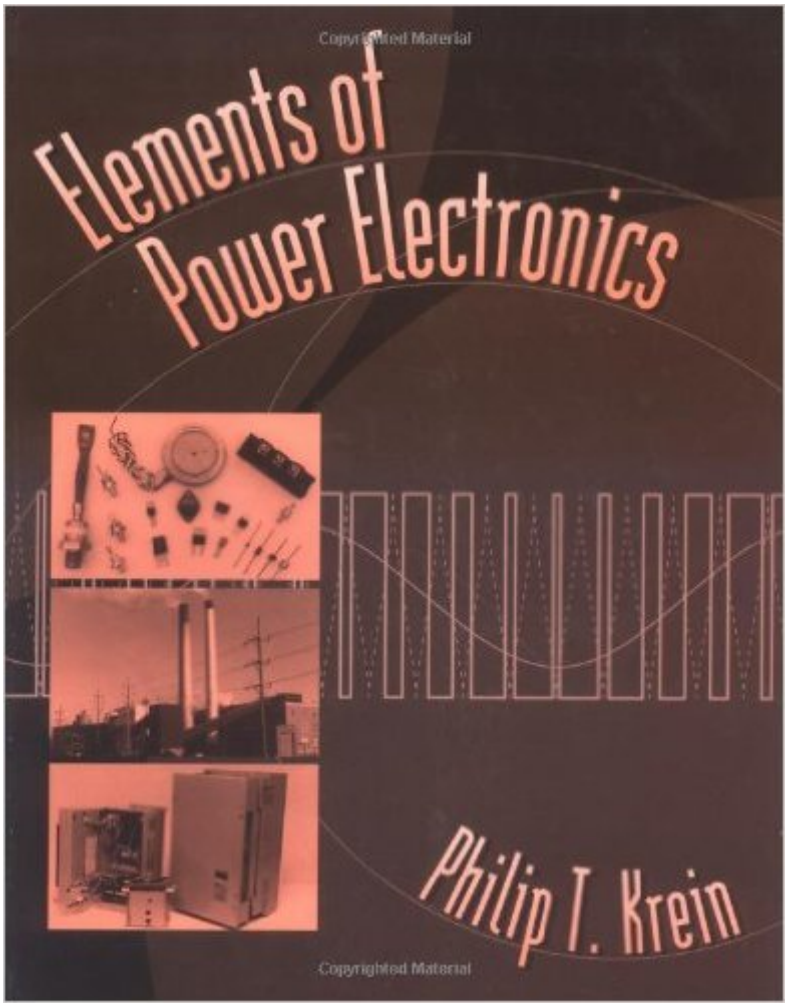
Elements Of Power Electronics (The Oxford Series In Electrical And Computer Engineering)



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Synopsis

Power electronics is an enabling technology for almost all electrical applications. The field is growing rapidly because electrical devices need electronic circuits to process their energy. Elements of Power Electronics, the first undergraduate book to discuss this subject in a conceptual framework, provides comprehensive coverage of power electronics at a level suitable for undergraduate student engineers, students in advanced degree programs, and novices in the field. It aims to establish a fundamental engineering basis for power electronics analysis, design, and implementation, offering broad and in-depth coverage of basic material. The text's unifying framework includes the physical implications of circuit laws, switching circuit analysis, and the basis for converter operation and control. Dc-dc, ac-dc, dc-ac, and ac-ac conversion tasks are examined and principles of resonant converters and discontinuous converters are discussed. Models for real devices and components are developed in depth, including models for real capacitors, inductors, wire connections, and power semiconductors. Magnetic device design is introduced, and thermal management and drivers for power semiconductors are addressed. Control system aspects of converters are discussed, and both small-signal and geometric controls are explored. Many examples show ways to use modern computer tools such as Mathcad, Matlab, and Mathematica to aid in the analysis and design of conversion circuits. Featuring a fundamental approach to power electronics coupled with extensive discussion of design and implementation issues, Elements of Power Electronics serves as an ideal text for courses in power electronics and as a helpful guide for engineers new to the field. Special features of the text include: Â More than 160 examples, particularly design examples, and 350 chapter problems that support the presented concepts. Â An extensive World Wide Web site (http://power.ece.uiuc.edu/krein_text) which includes additional problems, laboratory materials, selected solutions for students, computer-based examples, analysis tools for Mathcad, Matlab, and Mathematica, and author contact. Â A solutions manual which will be made available to registered faculty via both the World Wide Web site (http://power.ece.uiuc.edu/krein_text)and an ftp site (ftp://power.ece.uiuc.edu/krein_text).

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Customer Reviews

I have the three major current power electonics texts on my desk, so I think a comparison may be useful. The books are:1. This book, Krein2. Mohan, Undeland and Robbins Power Electronics: Converters, Applications, and Design3. Kassakian, et al. Principles of Power ElectronicsIn a nutshell:1. Krein is the most readable. It is also impressively comprehensive, featuring an entire chapter on discontinuous-mode operation, and an introduction to control as seen through the lens of power electronics.Krein is not a detailed step-by-step power supply design book. None of the three of these are, and that is not what you go shopping for when you buy a power electronics text book. More appropriate texts are Switching Power Supply Design, 3rd Ed., Switchmode Power Supply Handbook 3/E, and High Frequency Switching Power Supplies: Theory and Design. The reviewer below who found fault with this is missing the point.

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