River Publishers

Power electronics

Fundamental analysis and solved exercises

Authors:
Farid Hamoudi, University of Bejaia, Algeria

Power electronics has become one of the most essential fields in modern electrical engineering, situated at the crossroads of energy systems and electronics. *Power Electronics: Fundamental Analysis and Solved Exercises* is the result of several years of teaching experience and research activities in this domain. It is designed as a comprehensive learning resource primarily for undergraduate and master's students, while also serving engineers and technicians who wish to strengthen their knowledge.

The textbook aims to provide a clear, progressive, and methodical approach to the analysis, operation, and control of power electronic converters. It is organized into seven chapters, beginning with an introduction to the field and its applications, followed by an in-depth study of the main power conversion stages: AC–DC, AC–AC, DC–DC, and DC–AC conversion. An appendix presents the essential mathematical tools and numerical methods used in signal and harmonic analysis.

Each chapter develops concepts step by step, supported by detailed mathematical derivations, explanatory diagrams, and characteristic waveforms. Numerous solved exercises enhance understanding and help readers master both theoretical foundations and practical applications, making the book suitable for coursework, teaching support, and self-study.
TABLE OF CONTENTS

Chapter 1 – Introduction to Power Electronics

Chapter 2 – Power Semiconductor Devices

Chapter 3 – Uncontrolled AC–DC Converters

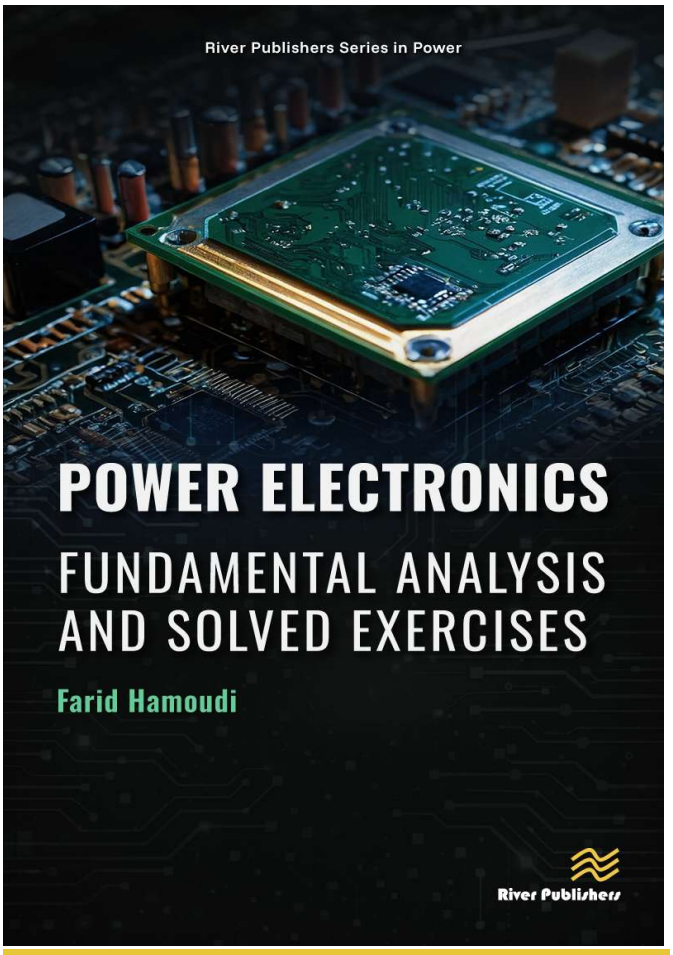
Chapter 4 – Controlled AC–DC Converters

Chapter 5 – AC–AC Converters

Chapter 6 – DC–DC Converters

Chapter 7 – DC–AC Converters

Appendix – Mathematical Tools for Power Electronics



River Publishers Series in Power

ISBN: 9788743814320
e-ISBN: 9788743814337
Available From: March 2027
Price: € 138.55

KEYWORDS:
Power electronics, rectifiers, AC-to-AC voltage controllers, DC-to-DC converters, DC-to-AC converters, single-phase and three-phase converters, continuous conduction mode, discontinuous conduction mode, converter performance analysis.

www.riverpublishers.com
marketing@riverpublishers.com