1. Record Nr. UNINA9910828276203321

Autore	Ioinovici Adrian <1950->
Titolo	Power electronics and energy conversion systems . Volume 1 Fundamentals and hard-switching converters / / Adrian Ioinovici
Pubbl/distr/stampa	Chichester, West Sussex ; ; Hoboken, : John Wiley & Sons, 2012
ISBN	1-118-44335-7 1-118-44304-7 1-299-44944-1 1-118-44336-5
Edizione	[1st ed.]
Descrizione fisica	1 online resource (869 p.)
Disciplina	621.31/7
Soggetti	Power electronics Electric current converters Electric circuits Switching circuits
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Power Electronics and Energy Conversion Systems; Contents; Preface; 1 Introduction; 1.1 Why Energy Conversion Electronics Circuits?; 1.1.1 Applications in the Information and Telecommunication Industry; 1.1.2 Applications in Renewable Energy Conversion; 1.1.3 Future Energy Conversion - Fuel Cells; 1.1.4 Electric Vehicles; 1.1.5 Applications in Electronic Display Devices; 1.1.6 Audio Amplifiers; 1.1.7 Applications in Portable Electronic Devices; 1.1.8 Applications in High Voltage Physics Experiments and Atomic Accelerators; 1.1.9 Lighting Technology; 1.1.10 Aerospace Applications 1.1.11 Power System Conditioning 1.1.12 Energy Recycling in Manufacturing Industry; 1.1.13 Applications in Space Exploration; 1.1.14 Defense Applications; 1.1.15 Drives and High-Power Industrial Applications; 1.1.16 Classification of Power Electronic Circuits; 1.2 Basic Principles of Operation of a Power Electronics Circuit; 1.3 Basic Components of the Power Circuit: Power Semiconductor Switches and Passive Reactive Elements; 1.3.1 Uncontrollable Switches - Power Diodes; 1.3.2 Semicontrollable Switches (Thyristors); 1.3.3 Controllable

Switches; 1.3.3.1 Bipolar Junction Transistor (BJT)
1.3.3.2 Power Metal Oxide Semiconductor Field-Effect Transistor (MOSFET)1.3.3.3 Insulated Gate Bipolar Transistor (IGBT); 1.3.4 Gallium Nitride (GaN) Switch Technology; 1.3.5 Energy Losses Associated with Power Switches; 1.3.5.1 Switching Losses; 1.3.5.2 Off-State Leakage Power Loss; 1.3.5.3 Conduction Power Loss; 1.3.5.4 Gate Drive Power Loss; 1.3.5.5 Heat Sinks; 1.3.5.6 Outline for Choosing a Transistor; 1.3.6 Passive Reactive Elements; 1.3.6.1 Capacitors; 1.3.6.2 Inductors, Transformers, Coupled Inductors; 1.3.7 Ultracapacitors
1.4 Basic Steady-State Analysis of Duty Cycle Controlled Converters with Constant Switching Frequency 1.4.1 Input-to-Output Voltage Ratio for Basic DC-DC Converters; 1.4.2 Continuous and Discontinuous Conduction Operation Modes; 1.4.3 Design of the Elements of the Basic Converters; 1.4.4 Controller for Duty Cycle Control (PWM); 1.4.5 Conversion Efficiency, Hard-switching and Soft-switching; 1.5 Introduction to Switched-Capacitor (SC) Converters; 1.6 Frequency-Controlled Converters; 1.6.1 Resonant Converters; 1.6.2 Quasi-Resonant Converters (QRC)
1.7 Overview on AC-DC Rectifiers and DC-AC Inverters 1.7.1 Rectifiers; 1.7.2 Inverters; 1.8 Case Studies; 1.8.1 Case Study 1; 1.8.2 Case Study 2; 1.8.3 Case Study 3; 1.9 Highlights of the Chapter; Problems; Bibliography; 2 Modeling DC-DC Converters; 2.1 What is the Purpose of Modeling the Power Stage?; 2.2 Average State-Space Equations, Small-Ripple Approximation (Time-Linearization); 2.3 DC Voltage Gain and AC Small-Signal Open-Loop Transfer Functions Based on Average State-Space Equations for Converters Operating in Continuous Conduction Mode
2.3.1 DC Voltage Gain and AC Open-Loop Line-to-Load Voltage Transfer Function

Sommario/riassunto

Power Electronics and Energy Conversion Systems is a definitive five-volume reference spanning classical theory through practical applications and consolidating the latest advancements in energy conversion technology. Comprehensive yet highly accessible, each volume is organised in a basic-to-sophisticated crescendo, providing a single-source reference for undergraduate and graduate students, researchers and designers.Volume 1 Fundamentals and Hard-switching Converters introduces the key challenges in power electronics from basic components to operation principles and