

1. Record Nr.	UNINA9910784544303321
Autore	Luo Fang Lin
Titolo	Digital power electronics and applications [[electronic resource] /] / Fang Lin Luo, Hong Ye, Muhammed Rashid
Pubbl/distr/stampa	London, : Elsevier Academic, 2005
ISBN	1-280-63787-0 9786610637874 0-08-045902-1
Descrizione fisica	1 online resource (421 p.)
Altri autori (Persone)	YeHong <1973-> RashidM. H
Disciplina	621.317
Soggetti	Power electronics Digital electronics Digital control systems
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	Cover; Digital Power Electronics and Applications; Contents; Preface; Autobiography; 1. Introduction; 1.1 Historical review; 1.1.1 WORK, ENERGY AND HEAT; 1.1.2 DC AND AC EQUIPMENT; DC Power Supply; AC Power Supply; 1.1.3 LOADS; Linear Passive Loads; Linear Dynamic Loads; 1.1.4 IMPEDANCE; 1.1.5 POWERS; Apparent Power S; Power P; Reactive Power Q; 1.2 Traditional parameters; 1.2.1 POWER FACTOR (PF); 1.2.2 POWER-TRANSFER EFFICIENCY (); 1.2.3 TOTAL HARMONIC DISTORTION (THD); 1.2.4 RIPPLE FACTOR (RF); 1.2.5 APPLICATION EXAMPLES; Power and Efficiency (); An R-L Circuit Calculation A Three-Phase Circuit Calculation1.3 Multiple-quadrant operations and choppers; 1.3.1 THE FIRST-QUADRANT CHOPPER; 1.3.2 THE SECOND-QUADRANT CHOPPER; 1.3.3 THE THIRD-QUADRANT CHOPPER; 1.3.4 THE FOURTH-QUADRANT CHOPPER; 1.3.5 THE FIRST-SECOND-QUADRANT CHOPPER; 1.3.6 THE THIRD-FOURTH-QUADRANT CHOPPER; 1.3.7 THE FOUR-QUADRANT CHOPPER; 1.4 Digital power electronics: pump circuits and conversion technology; 1.4.1 FUNDAMENTAL PUMP CIRCUITS; 1.4.2 AC/DC RECTIFIERS; 1.4.3 DC/AC PWM INVERTERS; 1.4.4 DC/DC CONVERTERS; 1.4.5 AC/AC CONVERTERS

1.5 Shortage of analog power electronics and conversion technology
 1.6 Power semiconductor devices applied in digital power electronics;
 FURTHER READING; 2. Energy Factor (EF) and Sub-sequential
 Parameters; 2.1 Introduction; 2.2 Pumping energy (PE); 2.2.1 ENERGY
 QUANTIZATION; 2.2.2 ENERGY QUANTIZATION FUNCTION; 2.3 Stored
 energy (SE); 2.3.1 STORED ENERGY IN CONTINUOUS CONDUCTION
 MODE; Stored Energy (SE); Capacitor-Inductor Stored Energy Ratio (CIR);
 Energy Losses (EL); Stored Energy Variation on Inductors and Capacitors
 (VE); 2.3.2 STORED ENERGY IN DISCONTINUOUS CONDUCTION MODE
 (DCM)
 2.4 Energy factor (EF) 2.5 Variation energy factor (EF_(V)); 2.6 Time
 constant, τ , and damping time constant, τ_d ; 2.6.1 TIME
 CONSTANT, τ ; 2.6.2 DAMPING TIME CONSTANT, τ_d ; 2.6.3 TIME
 CONSTANT RATIO, τ/τ_d ; 2.6.4 MATHEMATICAL MODELING FOR POWER
 DC/DC CONVERTERS; 2.7 Examples of applications; 2.7.1 A BUCK
 CONVERTER IN CCM; Buck Converter without Energy Losses ($r_L = 0$);
 Buck Converter with Small Energy Losses ($r_L = 1.5$); Buck
 Converter with Energy Losses ($r_L = 4.5$); Buck Converter with
 Large Energy Losses ($r_L = 6$)
 2.7.2 A SUPER-LIFT LUO-CONVERTER IN CCM 2.7.3 A BOOST
 CONVERTER IN CCM (NO POWER LOSSES); 2.7.4 A BUCK-BOOST
 CONVERTER IN CCM (NO POWER LOSSES); 2.7.5 POSITIVE-OUTPUT LUO-
 CONVERTER IN CCM (NO POWER LOSSES); 2.8 Small signal analysis;
 2.8.1 A BUCK CONVERTER IN CCM WITHOUT ENERGY LOSSES ($r_L = 0$);
 2.8.2 BUCK-CONVERTER WITH SMALL ENERGY LOSSES ($r_L = 1.5$);
 2.8.3 SUPER-LIFT LUO-CONVERTER WITH ENERGY LOSSES ($r_L = 0.12$);
 FURTHER READING; APPENDIX A - A SECOND-ORDER
 TRANSFER FUNCTION; A.1 Very Small Damping Time Constant; A.2
 Small Damping Time Constant
 A.3 Critical Damping Time Constant

Sommario/riassunto

The purpose of this book is to describe the theory of Digital Power Electronics and its applications. The authors apply digital control theory to power electronics in a manner thoroughly different from the traditional, analog control scheme. In order to apply digital control theory to power electronics, the authors define a number of new parameters, including the energy factor, pumping energy, stored energy, time constant, and damping time constant. These parameters differ from traditional parameters such as the power factor, power transfer efficiency, ripple factor, and total harmonic distortion.