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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 technology1.6 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[sub(V)]); 2.6 Time constant, , and damping time constant, [sub(d)]; 2.6.1 TIME CONSTANT, ; 2.6.2 DAMPING TIME CONSTANT, [sub(d)]; 2.6.3 TIME CONSTANT RATIO, ; 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[sub(L)] = 0); Buck Converter with Small Energy Losses (r[sub(L)] = 1.5); Buck Converter with Energy Losses (r[sub(L)] = 4.5); Buck Converter with Large Energy Losses (r[sub(L)] = 6)
2.7.2 A SUPER-LIFT LUO-CONVERTER IN CCM2.7.3 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[sub(L)] = 0); 2.8.2 BUCK-CONVERTER WITH SMALL ENERGY LOSSES (r[sub(L)] = 1.5); 2.8.3 SUPER-LIFT LUO-CONVERTER WITH ENERGY LOSSES (r[sub (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 distor