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Nota di contenuto	Cover; Title Page; Contents; Chapter 1. Phenomena of Perturbation in Electrical Systems; 1.1. Electromagnetic perturbations in energy systems; 1.1.1. Introduction; 1.2. Power grid harmonics; 1.2.1 Presentation; 1.2.2. Characterization of the quality of electrical energy; 1.2.3. Relevant standards for harmonic emissions; 1.2.4. Classification of appliances; 1.2.5. The limits of harmonic currents; 1.2.6. Examples of observations of harmonic currents; 1.2.7. Fluorescent lighting scenario 1.2.8. Practical scenario of the improvement of the total harmonic distortion generated by a variable-frequency drive 1.2.9. Converter with sinusoidal absorption; 1.3. Common-mode and differential-mode conducted perturbations; 1.3.1. Common mode and differential mode; 1.3.2. Crosstalk; 1.4. Measuring electromagnetic perturbations; 1.4.1. The line impedance stabilization network; 1.4.2. Current sensors; 1.4.3. Antennae; 1.4.4. Spectrum analyzer; 1.5. The standards; 1.6. Bibliography; Chapter 2. Fundamental Principles; 2.1. Sources of noise: the switching cell and its control

2.1.1. Origin of conducted and radiated perturbations in static converters 2.2. Modeling; 2.2.1. Simple model of the switching cell; 2.2.2. More complex model of the switching cell; 2.3. Characterization of coupling functions and parasitic elements; 2.3.1. Passive components and differential-mode effects; 2.3.2. Invisible parasitic elements and common-mode effects; 2.3.3. Parasitic effects contributing to undesirable couplings; 2.4. Electromagnetic compatibility study of a practical scenario: the Buck chopper; 2.4.1. Description of the case study 2.4.2. Influence of the design parameters of the converter 2.4.3. Influence of technological parameters and control; 2.4.4. Other sources of switching noise; 2.4.5. Other switching modes: soft switching, advantages and constraints; 2.5. EMC study of an insulated DC-DC fly back power supply; 2.5.1. Description of the device; 2.5.2. Creation of the circuit model; 2.5.3. Analysis of switchings in the structure; 2.5.4. Electric simulation of the complete structure; 2.6. Corrected exercise number 1: conducted perturbations of a step-up chopper; 2.7. Answers with comments; 2.8. Bibliography

Chapter 3. EMC of Complex Electrical Energy Conversion Systems: Electromagnetic Actuators 3.1. How to define a complex system?; 3.2. Qualitative study; 3.2.1. Description of the conversion chain; 3.2.2. Reminder of the standards; 3.2.3. Propagation methods; 3.3. Modeling in frequency domain; 3.3.1. Linearization of the switching cell; 3.3.2. Modeling of the perturbation sources; 3.4. Frequency-based representation of an inverter; 3.4.1. Equivalent common-mode source - simplified diagram; 3.4.2. Differential-mode influence; 3.4.3. Proposed frequency-based diagram 3.5. Modeling of the cables and motors

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## Sommario/riassunto

Scientists largely attribute the recent deterioration of the electromagnetic environment to power electronics. This realization has spurred the study of methodical approaches to electromagnetic compatibility designs as explored in this text. The book addresses major challenges, such as handling numerous parameters vital to predicting electro magnetic effects and achieving compliance with line-harmonics norms, while proposing potential solutions.

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