



# VSC-FACTS, HVDC and PMU: Analysis, Modelling and Simulation in Power Grids

*Enrique E. Acha, Rodrigo García-Valle, Luigi Vanfretti, Antonio de la Villa Jaén, Behzad Kazemtabrizi, Pedro Roncero*

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**Contains the most up-to-date research on Flexible Alternating Current Transmission Systems (FACTS) and discusses its technological convergence with the long-standing application of High Voltage Direct Current (HVDC) using Voltage Source Converters (VSC)**

The book describes technology that has emerged over the past five years in the area of Flexible Alternating Current Transmission Systems (FACTS) and its technological convergence with the long-standing application of High Voltage Direct current (HVDC) using Voltage Source Converters (VSC), including back-to-back and point-to-point HVDC-VSC applications and the multi-terminal application. The subject is addressed from a modern perspective, including the latest development in the wider power systems industry that will extend the applicability of the FACTS-HVDC-VSC technology. For the first time, the topics of multi-terminal HVDC-VSC and phasor measurement units for FACTS monitoring and control applications are covered. Unlike Professor Acha's previous book, this book addresses new FACTS power system application areas which have received attention from the industry over the last five years. These areas include: FACTS state estimation, constrained OPF, harmonic penetration, studies of FACTS dynamic performance and control, and the exploitation of phasor measurement units (PMUs), analysis, and control applications. These coincide with research areas which the authors have developed, published in IEEE journals, and presented at international forums.

- Addresses new FACT power system application areas that have emerged over the past five years, including state estimation, constrained optimal power flow (OPF), and harmonic penetration
- Presents studies of FACTS dynamic performance and control, and the exploitation of phasor measurement units (PMU) which are considered to be one of the most important future devices for advanced FACTS monitoring, analysis and control
- Facilitates hands-on experience in modelling, analysis and simulation of electrical power networks with FACTS-HVDC-VSC equipment, by providing MATLAB routines and suitable data with each new model and application area presented in the book
- Comes with a companion website hosting software-based case studies

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