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Nota di contenuto	Introduction -- Adaptive backstepping current control of single-phase LCL-grid-connected inverters to improve its large-signal stability in the presence of parasitic resistance uncertainty -- An adaptive dual-loop Lyapunov-based control scheme for a single-phase stand-alone inverter to improve its large-signal stability -- Lyapunov-based control of three-phase stand-alone inverters to improve its large-signal stability with inherent dual control loops and load disturbance adaptivity -- An ellipse-optimized composite backstepping control strategy for a point-of-load inverter to improve its large-signal stability under load disturbance in the shipboard power system -- Stability constraining dichotomy solution based model predictive control for the three phase inverter cascaded with input EMI filter in the MEA -- Composite-bisection predictive control to stabilize the three phase inverter cascaded with input EMI filter in the SPS -- Reinforcement learning basedweighting factors' real-time updating scheme for the FCS model predictive control to improve the large-signal stability of inverters.

Sommario/riassunto

This book introduces a family of large-signal stability-based control methods for different power inverters (grid-connected inverter, standalone inverter, single-phase inverter, and three-phase inverter) in practical applications. Power inverters have stability issues, which include the inverter's own instability as well as the inverter's instability in relation to the other power electronic devices in the system (i.e., weak grid and the EMI filter). Most of the stability analyses and solutions are based on small-signal stability technology. Unfortunately, in actuality, the majority of practical instability concerns in power inverter systems are large-signal stability problems, which, when compared to small-signal stability problems, can cause substantial damage to electrical equipment. As a result, researchers must conduct a comprehensive investigation of the large-signal stability challenge and solutions for power inverters. This book can be used as a reference for researchers, power inverters manufacturers, and end-users. As a result, the book will not become obsolete in the near future, regardless of technology advancements.