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Sommario/riassunto

Advanced Control of Power Converters Unique resource presenting advanced nonlinear control methods for power converters, plus simulation, controller design, analyses, and case studies Advanced Control of Power Converters equips readers with the latest knowledge of three control methods developed for power converters: nonlinear control methods such as sliding mode control, Lyapunov-function-based control, and model predictive control. Readers will learn about the design of each control method, and simulation case studies and results will be presented and discussed to point out the behavior of each control method in different applications. In this way, readers wishing to learn these control methods can gain insight on how to design and simulate each control method easily. The book is organized into three clear sections: introduction of classical and advanced control methods, design of advanced control methods, and case studies. Each control method is supported by simulation examples along with Simulink models which are provided on a separate website. Contributed to by five highly qualified authors, Advanced Control of Power Converters covers sample topics such as: Mathematical modeling of single- and three-phase grid-connected inverter with LCL filter, three-phase dynamic voltage restorer, design of sliding mode control and switching frequency computation under single- and double-band hysteresis modulations Modeling of single-phase UPS inverter and three-phase rectifier and their Lyapunov-function-based control design for global stability assurance Design of model predictive control for single-phase T-type rectifier, three-phase shunt active power filter, three-phase quasi-Z-source inverter, three-phase rectifier, distributed generation inverters in islanded ac microgrids How to realize the Simulink models in sliding mode control, Lyapunov-function-based control and model predictive control How to build and run a real-time model as well as rapid prototyping of power converter by using OPAL-RT simulator Advanced Control of Power Converters is an ideal resource on the subject for researchers, engineering professionals, and undergraduate/graduate students in electrical engineering and mechatronics; as an advanced level book, and it is expected that readers will have prior knowledge of power converters and control systems.