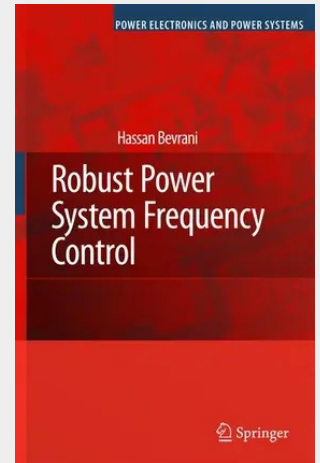


Robust Power System Frequency Control

Robust Techniques

This book emphasizes the physical and engineering aspects of the power system frequency control design problem while providing a conceptual understanding of frequency regulation and application of robust control techniques. The material develops an appropriate intuition method relative to the robust load frequency regulation problem in real-world power systems, rather than describing mathematical analytical methods. The simplest possible frequency response models and control structures are used for conceptual explanations and practical control design. The book summarizes the author's long term research outcomes, contributions and experiences with power system frequency regulation during more than a decade of academic and working activities in Iran, Japan, and Australia.

Frequency control as a major function of automatic generation control is one of the important control problems in electric power system design and operation, and is becoming more significant today due to the increasing size, changing structure, emerging new uncertainties, environmental constraints, and the complexity of power systems. Robust Power System Frequency Control uses the recent development of linear robust control theory to provide practical, systematic, fast, and flexible algorithms for the tuning of power system load-frequency controllers. The physical constraints and important challenges related to the frequency regulation issue in a deregulated environment are emphasized, and most results are supplemented by real-time simulations. The developed control strategies attempt to bridge the existing gap between the advantages of robust/optimal control and traditional power system frequency control design. The material summarizes the long term research outcomes and contributions of the author's experience with power system frequency regulation. It provides a thorough understanding of the basic principles of power system frequency behavior over a wide range of operating conditions. It uses simple frequency response models, control structures and mathematical algorithms to adapt modern robust control theorems with frequency control issues as well as conceptual explanations. The engineering aspects of frequency regulation have been considered, and practical methods for computer analysis and design are also discussed. Robust Power System Frequency Control provides a comprehensive coverage of frequency control understanding, simulation and design. The material develops an appropriate intuition relative to the robust load frequency regulation problem in real-world power systems, rather than to describe sophisticated mathematical analytical methods.



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