

Robust Control in Power Systems Library of Congress Cataloging-in-Publication Data A C.L.P. Catalogue record for this book is available from the Library of Congress. ISBN 0-387-25949-X e-ISBN 0-387-25950-3 Printed on acid-free paper. ISBN 978-0387-25949-9

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 ...

This paper proposes an effective method such that the robust load frequency control (LFC) scheme can be designed efficiently for the large-scale power system with time delay. A novel constraint time-delayed ordinary differential equation (CTODE) model is proposed, based on which a new bounded real lemma (BRL) is established for the H^∞ ...

His special fields of interest include intelligent and robust control applications in Power Systems and Power Electronics. He is a Senior Member of the IEEE, and the author of 3 books, numerous chapters in contributed volumes, and over 150 papers in respected international journals and conference proceedings.

Power system controls are of many types including [1, 21, 37] generation excitation controls, prime mover controls, generator/load tripping, fast fault clearing, high-speed re-closing, dynamic braking, reactive power compensation, load-frequency control, current injection, fast phase angle control and HVDC special controls on the point of view of operations, all ...

This updated edition of the industry standard reference on power system frequency control provides practical, systematic and flexible algorithms for regulating load frequency, offering new solutions to the technical challenges introduced by the escalating role of distributed generation and renewable energy sources in smart electric grids.

Microgrids consisting of photovoltaic (PV) power plants and wind farms have been widely accepted in power systems for reliability enhancement and power loss reduction. Microgrids are capable of providing voltage and frequency support, improving power quality, and achieving proper power-sharing. To achieve such goals and deal with the nonlinear behavior in such ...

The main contributions of this paper are (i) designing a robust, coordinated controller using polytopic design and mixed control to damp SSOs in wind-integrated power systems; (ii) representing unmeasurable state variables ...

Linear Control in Power Systems.- Test System Model.- Power System Stabilizers.- Multiple-Model Adaptive Control Approach.- Simultaneous Stabilization.- ... In this article, the authors show that conic programming is an effective tool to solve robust power system stabilizer (PSS) design problems, namely coordinated gain tuning and coordinated ...

A centralized wide area controller design using systemwide data is proposed to enhance the dynamic performance of a large power system. The time delay exists in the data communication for this controller. Long time delay may be a detriment to wide area control system stability and delay may degrade system robustness. This paper analyzes the impact of time ...

Robust control in power systems: Author(s) Pal, Bikash; Chaudhuri, Balarko: Publication Dordrecht : Springer, 2006. - 207 p. Abstract Deals with the applications of techniques in linear system theory to control low frequency oscillations in power systems. This book focuses on the analysis and damping of inter-area oscillations in the systems ...

Robust Decentralized Secondary Frequency Control in Power Systems: Merits and Trade-Offs Erik Weitenberg, Yan Jiang, Changhong Zhao, Enrique Mallada, Claudio De Persis, and Florian Dörfler Abstract--Frequency restoration in power systems is conventionally performed by broadcasting a centralized signal to local controllers.

Robust control in power systems by Pal, Bikash, 1968-Publication date 2005 Topics Electric power systems -- Control Publisher New York : Springer Collection internetarchivebooks; inlibrary; printdisabled Contributor Internet Archive Language English Item ...

Robust Control in Power Systems Bikash Pal and Balarko Chaudhuri ISBN 978-0-387-25949-9 Applied Mathematics for Restructured Electric Power Systems: Optimization, Control, and Computational Intelligence Joe H. Chow, Felix F. Wu, and James A. Momoh, eds. ISBN 978-0-387-23470-0 HVDC and FACTS Controllers: Applications of Static Converters in ...

This study describes a robust load-frequency control (LFC) scheme in a two-area interconnected power system with uncertain disturbances. A sector-bounded H^{∞} control approach is used for compensating of the non-linearities based on a minimum order dynamic LFC model to avoid the complexity of a high-order model. The simulation in time domain from the ...

Kumar A, Bhadu M, Arora A (2022) Coordinated wide-area damping control in modern power systems embedded with utility-scale wind-solar plants. IETE J Res 1-24. ... Arora, A., Bhadu, M., Kumar, A. (2024). Performance Enhancement of AC Microgrid Using Robust Control Strategies in Modern Power Systems.

Parametric uncertainty, which is also known as structured uncertainty, is a significant topic in power system frequency control synthesis, and thus robust control theorems are widely used in the design of power grid LFC systems in the past three decades.

Robust Power System Frequency Control means the control must provide adequate minimization on a system's frequency and tie-line power deviation, and expend the security margin to cover all operating conditions and possible system configurations.

This paper provides a tutorial overview of robust optimization in power systems, including robust optimization and adaptive robust optimization. We also introduce distributionally robust optimization. For illustration purposes, we describe and analyze a short-term operation problem and a long-term planning one. The operation problem allows identifying the ...

Real-Time Stability in Power Systems: Techniques for Early Detection of the Risk of Blackout Savu C. Savulesco, ed. ISBN 978-0-387-25626-9 Robust Control in Power Systems Bikash Pal and Balarko Chaudhuri ISBN 978-0-387-25949-9 Applied Mathematics for Restructured Electric Power Systems: Optimization, Control, and Computational Intelligence

With the gradual improvement of system data observability, AI-based schemes have been developed well due to their advantage of addressing insufficient knowledge about the system model [24]. The fuzzy logical controller is an AI-based LFC scheme proposed to improve the control accuracy at the early stage [33], such as PSO tuned fuzzy logic controller applied ...

Frequency restoration in power systems is conventionally performed by broadcasting a centralized signal to local controllers. As a result of energy transition, technological advances, and scientific interest in distributed control and optimization methods, a plethora of distributed frequency control strategies have been proposed recently, which rely on ...

Modern robust control theories have been developed significantly in the past years. The key idea in a robust control paradigm is to check whether the design specifications are satisfied even for the "worst-case" uncertainty. Many efforts have been taken to investigate the application of robust control techniques to power systems.

We consider a robust H_2 power flow tracking control strategy to regulate the line power flows to the specified limit, while attenuating the effect of disturbances on the system. Using synchrophasor measurements from the lines, the proposed controller can detect line overloading and automatically re-dispatch the selected generators and ...

Purpose Load frequency control (LFC) in today's modern power system is getting complex, due to intermittency in the output power of renewable energy sources along with substantial changes in the system parameters and loads. To address this problem, this paper proposes an adaptive fractional order (FO)-fuzzy-PID controller for LFC of a renewable ...

existing (non-passive) power system control schemes and models, and allows for the study of robustness with



Robust control in power systems

respect to delays. Index Terms--Power systems, frequency control, robust stability, decentralised control synthesis. I. INTRODUCTION The composition of the electric grid is in a state of flux [2].

Robust decentralized control in power systems Claudio De Persis Institute of Engineering and Technology J.C. Willems Center for Systems and Control PowerWeb Lunch Lecture TU Delft, December 13, 2018 Joint work with Weitenberg (RUG), Jiang ...

Web: <https://wholesalesolar.co.za>