



SHAORYUAN LI • YI ZHENG

DISTRIBUTED MODEL  
PREDICTIVE CONTROL FOR  
PLANT-WIDE SYSTEMS

WILEY

# Distributed Model Predictive Control For Plant Wide Systems

**Camilla Rothe**



## **Distributed Model Predictive Control For Plant Wide Systems:**

*Distributed Model Predictive Control for Plant-Wide Systems* Shaoyuan Li, Yi Zheng, 2015-07-24 DISTRIBUTED MODEL PREDICTIVE CONTROL FOR PLANT WIDE SYSTEMS In this book experienced researchers gave a thorough explanation of distributed model predictive control DMPC its basic concepts technologies and implementation in plant wide systems Known for its error tolerance high flexibility and good dynamic performance DMPC is a popular topic in the control field and is widely applied in many industries To efficiently design DMPC systems readers will be introduced to several categories of coordinated DMPCs which are suitable for different control requirements such as network connectivity error tolerance performance of entire closed loop systems and calculation of speed Various real life industrial applications theoretical results and algorithms are provided to illustrate key concepts and methods as well as to provide solutions to optimize the global performance of plant wide systems Features system partition methods coordination strategies performance analysis and how to design stabilized DMPC under different coordination strategies Presents useful theories and technologies that can be used in many different industrial fields examples include metallurgical processes and high speed transport Reflects the authors extensive research in the area providing a wealth of current and contextual information Distributed Model Predictive Control for Plant Wide Systems is an excellent resource for researchers in control theory for large scale industrial processes

Advanced students of DMPC and control engineers will also find this as a comprehensive reference text **New Directions on Model Predictive Control** Jinfeng Liu, Helen E Durand, 2019-01-16 This book is a printed edition of the Special Issue New Directions on Model Predictive Control that was published in Mathematics **Model Predictive Control of**

**Microgrids** Carlos Bordons, Félix Garcia-Torres, Miguel A. Rida, 2019-09-12 The book shows how the operation of renewable energy microgrids can be facilitated by the use of model predictive control MPC It gives readers a wide overview of control methods for microgrid operation at all levels ranging from quality of service to integration in the electricity market MPC based solutions are provided for the main control issues related to energy management and optimal operation of microgrids The authors present MPC techniques for case studies that include different renewable sources mainly photovoltaic and wind as well as hybrid storage using batteries hydrogen and supercapacitors Experimental results for a pilot scale microgrid are also presented as well as simulations of scheduling in the electricity market and integration of electric and hybrid vehicles into the microgrid in order to replicate the examples provided in the book and to develop and validate control algorithms on existing or projected microgrids Model Predictive Control of Microgrids will interest researchers and practitioners enabling them to keep abreast of a rapidly developing field The text will also help to guide graduate students through processes from the conception and initial design of a microgrid through its implementation to the optimization of microgrid management Advances in Industrial Control reports and encourages the transfer of technology in control engineering The rapid development of control technology has an impact on all areas of the control discipline The series offers an opportunity for

researchers to present an extended exposition of new work in all aspects of industrial control     Model Predictive Control mit MATLAB und Simulink Rainer Dittmar, 2019-12-04 Modellbasierte prädiktive Regelungen dienen der Lösung anspruchsvoller Aufgaben der Mehrgrößenregelung mit Beschränkungen der Stell- und Regelgrößen. Sie werden in der Industrie in vielen Bereichen erfolgreich eingesetzt. Mit der MPC Toolbox™ des Programmsystems MATLAB Simulink steht ein Werkzeug zur Verfügung, das sowohl in der industriellen Praxis als auch an Universitäten und Hochschulen verwendet wird. Das vorliegende Buch gibt einen Überblick über die Grundideen und Anwendungsvorteile des MPC-Konzepts. Es zeigt, wie mit Hilfe der Toolbox MPC-Regelungen entworfen, eingestellt und simuliert werden können. Ausgewählte Beispiele aus dem Bereich der Verfahrenstechnik demonstrieren mögliche Vorgehensweisen und vertiefen das Verständnis. Das Buch richtet sich an in der Industrie tätige Ingenieure, die MPC-Regelungen planen, entwickeln und betreiben, aber auch an Studierende technischer Fachdisziplinen, die in das Arbeitsgebiet MPC einsteigen wollen. Model Predictive Control (MPC) is used to solve challenging multivariable constrained control problems. MPC systems are successfully applied in many different branches of industry. The MPC Toolbox™ of MATLAB Simulink provides powerful tools for industrial MPC application but also for education and research at technical universities. This book gives an overview of the basic ideas and advantages of the MPC concept. It shows how MPC systems can be designed, tuned, and simulated using the MPC Toolbox. Selected process engineering benchmark examples are used to demonstrate typical design approaches and help deepen the understanding of MPC technologies. The book is aimed at engineers in industry interested in the development and application of MPC systems as well as students of different technical disciplines seeking an introduction into this field.

*Advanced Model Predictive Control* Tao Zheng, 2011-07-05 Model Predictive Control (MPC) refers to a class of control algorithms in which a dynamic process model is used to predict and optimize process performance. From lower request of modeling accuracy and robustness to complicated process plants, MPC has been widely accepted in many practical fields. As the guide for researchers and engineers all over the world concerned with the latest developments of MPC, the purpose of *Advanced Model Predictive Control* is to show the readers the recent achievements in this area. The first part of this exciting book will help you comprehend the frontiers in theoretical research of MPC such as Fast MPC, Nonlinear MPC, Distributed MPC, Multi-Dimensional MPC, and Fuzzy Neural MPC. In the second part, several excellent applications of MPC in modern industry are proposed, and efficient commercial software for MPC is introduced. Because of its special industrial origin, we believe that MPC will remain energetic in the future.

*Distributed Model Predictive Control* Aswin N.

Venkat,2006      **27th European Symposium on Computer Aided Process Engineering** ,2017-09-21 27th European Symposium on Computer Aided Process Engineering Volume 40 contains the papers presented at the 27th European Society of Computer Aided Process Engineering ESCAPE event held in Barcelona October 1 5 2017 It is a valuable resource for chemical engineers chemical process engineers researchers in industry and academia students and consultants for chemical industries Presents findings and discussions from the 27th European Society of Computer Aided Process Engineering ESCAPE event      *Plant-Wide Process Control* Kelvin T. Erickson,John L. Hedrick,1999-04-29 This book presents a complete methodology of control system design for continuous and batch manufacturing in such diverse areas as pulp and paper petrochemical chemical food pharmaceutical and biochemical production Geared to practicing engineers faced with designing increasingly more sophisticated control systems in response to present day economic and regulatory pressures Plantwide Process Control focuses on the engineering portion of a plant automation improvement project It features a full control design information package Control Requirements Definition or CRD and guides readers through all steps of the automation process from the initial concept to design simulation testing implementation and operation      **Dynamics and Control of Integrated Process Networks** Michael Baldea,2006      Dynamics and Control of Process Systems 2001 (DYCOPS-6) George Stephanopoulos,Jay Hyung Lee,En Sup Yoon,2001      **Plantwide Process Control** William L. Luyben,Björn D. Tyréus,Michael L. Luyben,1999 With four realistic case studies Tennessee Eastman isomerization vinyl acetate and HDA processes the first time a workable control structure for HDA has ever been published Plantwide Process Control gives chemical engineers and students the tools they need to design effective control schemes      *Control and Intelligent Systems* ,1999      Chemical Engineering Progress ,2007      **Advanced Control of Chemical Processes** ,1991      Process and Chemical Engineering ,2002      PIER Industrial, Agricultural, and Water Energy Efficiency Program RD & D Targets : Consolidated Roadmap ,2011      **Voltage Stability Enhancement Via Model Predictive Control** Bo Gong,2008      **Chemical Abstracts** ,2002      **Instrumentation, Controls, and Automation in the Power Industry** ,1991      Proceedings of the Industrial Computing Conference ,1991

## Reviewing **Distributed Model Predictive Control For Plant Wide Systems**: Unlocking the Spellbinding Force of Linguistics

In a fast-paced world fueled by information and interconnectivity, the spellbinding force of linguistics has acquired newfound prominence. Its capacity to evoke emotions, stimulate contemplation, and stimulate metamorphosis is truly astonishing. Within the pages of "**Distributed Model Predictive Control For Plant Wide Systems**," an enthralling opus penned by a highly acclaimed wordsmith, readers attempt an immersive expedition to unravel the intricate significance of language and its indelible imprint on our lives. Throughout this assessment, we shall delve to the book is central motifs, appraise its distinctive narrative style, and gauge its overarching influence on the minds of its readers.

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