

MODELLING AND CONTROL OF BIOTECHNOLOGICAL PROCESSES

Edited by
A. JOHNSON



Modelling And Control Of Biotechnological Processes

Spiros Agathos, W. Reineke



Modelling And Control Of Biotechnological Processes:

Modelling and Control of Biotechnological Processes A. Johnson, 2014-05-17 *Modelling and Control of Biotechnological Processes* contains the proceedings of the International Federation of Automatic Control's First Symposium on Modeling and Control of Biotechnological Processes held in Noordwijkerhout The Netherlands on December 11-13 1985 The papers explore modeling and control of biotechnological processes such as fermentation and biological wastewater treatment This book consists of 37 chapters divided into 11 sections and begins with a discussion on the control of fermentation processes modeling of biotechnical processes and application of measurement and estimation techniques to biotechnology The following sections focus on adaptive control theory applications of adaptive control and control and modeling of bioreactors The reader is also introduced to measurement techniques and sensors with emphasis on pyrolysis mass spectrometry rapid bioelectrochemical methods and a self-tuning controller for multiloop controlled fed batch fermentation The remaining sections deal with parameter identification and estimation Kalman filtering techniques optimization of production processes modeling of microkinetics and optimization theory This monograph will be of interest to researchers and practitioners in the field of biotechnology

Modelling and Control of Biotechnical Processes A. Halme, 2014-05-09 *Modeling and Control of Biotechnical Processes* covers the proceedings of the First International Federation of Automatic Control Workshop by the same title held in Helsinki Finland on August 17-19 1982 This book is organized into seven sections encompassing 37 chapters The opening section deals with the measurement techniques in fermentation processes and the use of automated analyzers to control microbial processes The next sections consider the concepts of bioreactor modeling and related problems as well as the modeling and control of biological wastewater treatment processes Other sections discuss the economic and static optimization the computer control of production processes and the application of estimation and identification methods to biotechnological processes The final sections explore the principles of real time analysis use of computer control in specific biotechnical production process control design and the modeling of adaptive control This book is of great value to biotechnologists biochemists and control engineers

Computer Applications in Fermentation

Technology: Modelling and Control of Biotechnological Processes N. M. Fish, 2012-12-06 Richard Fox Chairman Scientific Programme Committee Between 25th and 29th September 1988 243 people who either apply or research the use of computers in fermentation gathered together at Robinson College Cambridge UK They came from 30 countries The conference brought together two traditions Firstly it continued the series on Computer Applications in Fermentation Technology ICCAFT inaugurated by Henri Blanchere in Dijon in 1973 and carried forward in Philadelphia and Manchester Secondly it brought the expertise of the many members of the International Federation of Automatic Control IFAC who focused their attention on biotechnology at Noordwijkerhout in the Netherlands in December 1985 I am happy to say that the tradition carries on and a successor meeting will hopefully take place in the USA in 1991 If you find these proceedings useful

or stimulating then we hope to see you there We set out to make ICCAFT4 a close knit friendly conference We housed all who cared to in Robinson College itself and organised no parallel sessions Because we the organisers experience difficulty with the jargon of our colleagues from other disciplines we asked Bruce Beck to present a breakfast tutorial on modern control and modelling techniques and we set up informal panel discussions after dinner on two evenings Neville Fish chaired a forum on the microbiological principles behind models while Professors Derek Linkens and Ron Leigh led a discussion on expert systems in control

Modelling and Optimization of Biotechnological Processes Lei Zhi Chen, Sing Kiong Nguang, Xiao Dong Chen, 2007-07-04 Most industrial biotechnological processes are operated empirically One of the major difficulties of applying advanced control theories is the highly nonlinear nature of the processes This book examines approaches based on artificial intelligence methods in particular genetic algorithms and neural networks for monitoring modelling and optimization of fed batch fermentation processes The main aim of a process control is to maximize the final product with minimum development and production costs This book is interdisciplinary in nature combining topics from biotechnology artificial intelligence system identification process monitoring process modelling and optimal control Both simulation and experimental validation are performed in this study to demonstrate the suitability and feasibility of proposed methodologies An online biomass sensor is constructed using a current neural network for predicting the biomass concentration online with only three measurements dissolved oxygen volume and feed rate Results show that the proposed sensor is comparable or even superior to other sensors proposed in the literature that use more than three measurements Biotechnological processes are modelled by cascading two recurrent neural networks It is found that neural models are able to describe the processes with high accuracy Optimization of the final product is achieved using modified genetic algorithms to determine optimal feed rate profiles Experimental results of the corresponding production yields demonstrate that genetic algorithms are powerful tools for optimization of highly nonlinear systems Moreover a combination of recurrent neural networks and genetic algorithms provides a useful and cost effective methodology for optimizing biotechnological processes

Methods of Model Based Process Control R. Berber, 1995-05-31 Model based control has emerged as an important way to improve plant efficiency in the process industries while meeting processing and operating policy constraints The reader of Methods of Model Based Process Control will find state of the art reports on model based control technology presented by the world's leading scientists and experts from industry All the important issues that a model based control system has to address are covered in depth ranging from dynamic simulation and control relevant identification to information integration Specific emerging topics are also covered such as robust control and nonlinear model predictive control In addition to critical reviews of recent advances the reader will find new ideas industrial applications and views of future needs and challenges Audience A reference for graduate level courses and a comprehensive guide for researchers and industrial control engineers in their exploration of the latest trends in the area

Computer Applications in Biotechnology A. Munack, K. Schönert, 2014-05-23 The 6th Computer

Applications in Biotechnology CAB6 conference was a continuation of 2 series of events the IFAC symposia on Modelling and Control of Biotechnical Processes and the International Conferences on Computer Applications in Fermentation Technology This conference provided the opportunity for both sides leading researchers and industrial practitioners in this interdisciplinary field to exchange new ideas and technology concepts and solutions This postprint volume contains all those papers which were presented at the conference *Biotechnology for the Environment: Wastewater Treatment and Modeling, Waste Gas Handling* Spiros Agathos, W. Reineke, 2013-04-17 At the dawn of the 21st century biotechnology is emerging as a key enabling technology for sustainable environmental protection and stewardship Biotechnology for the Environment Wastewater Treatment and Modeling Waste Gas Handling illustrates the current technological applications of microorganisms in wastewater treatment and in the control of waste gas emissions In the first section of the book special emphasis is placed on the use of rigorous mathematical and conceptual models for an in depth understanding of the complex biology and engineering aspects underlying the operation of modern wastewater treatment installations The second part addresses waste gas biofiltration an expanding biotechnological application of microbial metabolism for air quality assurance through processes ranging from the abatement of hazardous volatile pollutants to the elimination of nuisance odors It will be a valuable reference source for environmental scientists engineers and decision makers involved in the development evaluation or implementation of biological treatment systems For more information on Strategy and Fundamentals see Focus on Biotechnology Volume 3A and for more information on Soil Remediation see Focus on Biotechnology Volume 3B

Principles and Applications of Fermentation Technology Arindam Kuila, Vinay Sharma, 2018-07-30 The book covers all aspects of fermentation technology such as principles reaction kinetics scaling up of processes and applications The 20 chapters written by subject matter experts are divided into two parts Principles and Applications In the first part subjects covered include Modelling and kinetics of fermentation technology Sterilization techniques used in fermentation processes Design and types of bioreactors used in fermentation technology Recent advances and future prospect of fermentation technology The second part subjects covered include Lactic acid and ethanol production using fermentation technology Various industrial value added product biosynthesis using fermentation technology Microbial cyp450 production and its industrial application Polyunsaturated fatty acid production through solid state fermentation Application of oleaginous yeast for lignocellulosic biomass based single cell oil production Utilization of micro algal biomass for bioethanol production Poly lactide production from lactic acid through fermentation technology Bacterial cellulose and its potential impact on industrial applications **Computer Applications in Biotechnology 2004** Marie-Noelle Pons, Jan Van Impe, 2005-08-02

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