

Modeling and Identification of Dynamic Systems

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SECOND EDITION

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Modeling And Identification Of Dynamic Systems

Lennart Ljung, Torkel Glad



Modeling And Identification Of Dynamic Systems:

Identification of Dynamic Systems Rolf Isermann, Marco Münchhof, 2010-11-22 Precise dynamic models of processes are required for many applications ranging from control engineering to the natural sciences and economics Frequently such precise models cannot be derived using theoretical considerations alone Therefore they must be determined experimentally This book treats the determination of dynamic models based on measurements taken at the process which is known as system identification or process identification Both offline and online methods are presented i e methods that post process the measured data as well as methods that provide models during the measurement The book is theory oriented and application oriented and most methods covered have been used successfully in practical applications for many different processes Illustrative examples in this book with real measured data range from hydraulic and electric actuators up to combustion engines Real experimental data is also provided on the Springer webpage allowing readers to gather their first experience with the methods presented in this book Among others the book covers the following subjects determination of the non parametric frequency response fast Fourier transform correlation analysis parameter estimation with a focus on the method of Least Squares and modifications identification of time variant processes identification in closed loop identification of continuous time processes and subspace methods Some methods for nonlinear system identification are also considered such as the Extended Kalman filter and neural networks The different methods are compared by using a real three mass oscillator process a model of a drive train For many identification methods hints for the practical implementation and application are provided The book is intended to meet the needs of students and practicing engineers working in research and development design and manufacturing

Modeling, Identification and Simulation of Dynamical Systems P. P. J. van den Bosch, A. C. van der Klauw, 2020-12-17 This book gives an in depth introduction to the areas of modeling identification simulation and optimization These scientific topics play an increasingly dominant part in many engineering areas such as electrotechnology mechanical engineering aerospace and physics This book represents a unique and concise treatment of the mutual interactions among these topics Techniques for solving general nonlinear optimization problems as they arise in identification and many synthesis and design methods are detailed The main points in deriving mathematical models via prior knowledge concerning the physics describing a system are emphasized Several chapters discuss the identification of black box models Simulation is introduced as a numerical tool for calculating time responses of almost any mathematical model The last chapter covers optimization a generally applicable tool for formulating and solving many engineering problems

Modeling and Identification of Dynamic Systems Lennart Ljung, Torkel Glad, Anders Hansson, 2021 Mathematical models of real life systems and processes are essential in today s industrial work To be able to construct such models is therefore a fundamental skill in modern engineering

Modeling & Identification of Dynamic Systems Lennart Ljung, Torkel Glad, 2016

Neural Network Modeling and Identification of Dynamical Systems Yuri

Tiumentsev, Mikhail Egorchev, 2019-05-17 *Neural Network Modeling and Identification of Dynamical Systems* presents a new approach on how to obtain the adaptive neural network models for complex systems that are typically found in real world applications. The book introduces the theoretical knowledge available for the modeled system into the purely empirical black box model, thereby converting the model to the gray box category. This approach significantly reduces the dimension of the resulting model and the required size of the training set. This book offers solutions for identifying controlled dynamical systems as well as identifying characteristics of such systems, in particular the aerodynamic characteristics of aircraft. Covers both types of dynamic neural networks: black box and gray box, including their structure synthesis and training. Offers application examples of dynamic neural network technologies primarily related to aircraft. Provides an overview of recent achievements and future needs in this area.

Modeling and Identification of Dynamic Systems - Exercises Peter Lindskog, Torkel Glad, Lennart Ljung, Jacob Roll, 2018-06-08. This book contains examples and exercises with modeling problems together with complete solutions. The contents is tailored to the book Ljung Glad *Modeling and Identification of Dynamic Systems*. Studentlitteratur 2016. The exercises are of different levels of difficulty and cover general modeling principles such as bond graphs as well as practical tools like Modelica and Simscape. System identification model and signal properties are also covered together with basic techniques for simulation. Most of the problems deal with issues from industrial applications but also economic, social and medical cases are covered. The text requires certain knowledge in linear algebra, signal and systems and basic familiarity with physics and statistics. The computer exercises assume access to basic software such as Matlab and Simulink and to some extent Modelica, Dymola, Simscape. The book is suitable for Master level courses in engineering but also for practicing engineers.

Modelling and Identification of Dynamic Systems N.K. Sinha, B. Kuszta, 1983-06-01. *Modeling of Dynamic Systems* Lennart Ljung, Torkel Glad, 1994. Written by a recognized authority in the field of identification and control, this book draws together into a single volume the important aspects of system identification AND physical modelling. KEY TOPICS: Explores techniques used to construct mathematical models of systems based on knowledge from physics, chemistry, biology, etc. e.g. techniques with so called bond graphs as well as those which use computer algebra for the modeling work. Explains system identification techniques used to infer knowledge about the behavior of dynamic systems based on observations of the various input and output signals that are available for measurement. Shows how both types of techniques need to be applied in any given practical modeling situation. Considers applications primarily simulation.

MARKET For practicing engineers who are faced with problems of modeling.

Modeling and Identification of Nonlinear Dynamic Systems Hassan Sassi, 1982.

Modeling, Identification, and Simulation of Dynamical Systems Paul P. J. Bosch, 1994. This book gives an in depth introduction to the areas of modeling, identification, simulation and optimization. These scientific topics play an increasingly dominant part in many engineering areas such as electrotechnology, mechanical engineering, aerospace and physics. This book represents a unique and concise treatment of the

mutual interactions among these topics Techniques for solving general nonlinear optimization problems as they arise in identification and many synthesis and design methods are detailed The main points in deriving mathematical models via prior knowledge concerning the physics describing a system are emphasized Several chapters discuss the identification of black box models Simulation is introduced as a numerical tool for calculating time responses of almost any mathematical model The last chapter covers optimization a generally applicable tool for formulating and solving many engineering problems

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