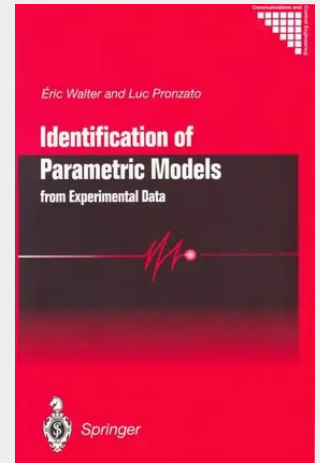


Identification of Parametric Models

from Experimental Data

The presentation of a coherent methodology for the estimation of the parameters of mathematical models from experimental data is examined in this volume. Many topics are covered including the choice of the structure of the mathematical model, the choice of a performance criterion to compare models, the optimization of this performance criterion, the evaluation of the uncertainty in the estimated parameters, the design of experiments so as to get the most relevant data and the critical analysis of results. There are also several features unique to the work such as an up-to-date presentation of the methodology for testing models for identifiability and distinguishability and a comprehensive treatment of parametric optimization which includes greater consideration of numerical aspects and which examines recursive and non-recursive methods for linear and nonlinear models.

The identification of parametric models from experimental data is a fundamental activity among researchers and engineers in pure and applied sciences. This work addresses the topic by examining, among others, the following areas: • choice of an appropriate model structure which allows the estimation of all parameters; • choice of a quality criterion for rating models; • incorporation of prior knowledge and objectives and guarding against possible outliers; • optimization of the selected criterion and simple yet exact evaluation of characteristics; • evaluation of uncertainty in estimated parameters; • design of experimental conditions for the collection of the most pertinent information given prior constraints and objectives. Identification of Parametric Models deals with these questions in a straightforward style while providing a global vision of the methodology. Suitable for engineers and researchers who practise mathematical modelling from experimental data, graduate students who wish to become acquainted with the field, this text will also be a valuable resource for specialists in the field.



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