

1. Record Nr.	UNINA9910144003103321
Autore	Dobre Tanase G
Titolo	Chemical engineering [[electronic resource]] : modelling, simulation, and similitude // Tanase G. Dobre and Jose G. Sanchez Marcano
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, c2007
ISBN	1-280-92175-7 9786610921751 3-527-61110-X 3-527-61109-6
Descrizione fisica	1 online resource (571 p.)
Altri autori (Persone)	Sanchez MarcanoJose G
Disciplina	660 660.072
Soggetti	Chemical engineering - Research - Methodology Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Chemical Engineering; Contents; Preface; 1 Why Modelling?; 1.1 Process and Process Modelling; 1.2 Observations on Some General Aspects of Modelling Methodology; 1.3 The Life-cycle of a Process and Modelling; 1.3.1 Modelling and Research and Development Stage; 1.3.2 Modelling and Conceptual Design Stage; 1.3.3 Modelling and Pilot Stage; 1.3.4 Modelling and Detailed Engineering Stage; 1.3.5 Modelling and Operating Stage; 1.4 Actual Objectives for Chemical Engineering Research; 1.5 Considerations About the Process Simulation; 1.5.1 The Simulation of a Physical Process and Analogous Computers References 2 On the Classification of Models; 2.1 Fields of Modelling and Simulation in Chemical Engineering; 2.1.1 Steady-state Flowsheet Modelling and Simulation; 2.1.2 Unsteady-state Process Modelling and Simulation; 2.1.3 Molecular Modelling and Computational Chemistry; 2.1.4 Computational Fluid Dynamics; 2.1.5 Optimisation and Some Associated Algorithms and Methods; 2.1.6 Artificial Intelligence and Neural Networks; 2.1.7 Environment, Health, Safety and Quality Models; 2.1.8 Detailed Design Models and Programs; 2.1.9 Process Control; 2.1.10 Estimation of Parameters

2.1.11 Experimental Design; 2.1.12 Process Integration; 2.1.13 Process Synthesis; 2.1.14 Data Reconciliation; 2.1.15 Mathematical Computing Software; 2.1.16 Chemometrics; 2.2 Some Observations on the Practical Use of Modelling and Simulation; 2.2.1 Reliability of Models and Simulations; 2.2.2 The Role of Industry as Final User of Modelling and Simulation; 2.2.3 Modelling and Simulation in Innovations; 2.2.4 Role of Modelling in Technology Transfer and Knowledge Management; 2.2.5 Role of the Universities in Modelling and Simulation Development; References

3 Mathematical Modelling Based on Transport Phenomena; 3.1 Algorithm for the Development of a Mathematical Model of a Process; 3.1.1 Some Observations about the Start of the Research; 3.1.2 The Limits of Modelling Based on Transport Phenomena; 3.2 An Example: From a Written Description to a Simulator; 3.3 Chemical Engineering Flow Models; 3.3.1 The Distribution Function and the Fundamental Flow Models; 3.3.2 Combined Flow Models; 3.3.3 The Slip Flow Effect on the Efficiency of a Mechanically Mixed Reactor in a Permanent Regime; 3.3.4 Dispersion Flow Model; 3.3.5 Examples
3.3.5.1 Mechanically Mixed Reactor for Reactions in Liquid Media
3.3.5.2 Gas Flow in a Fluidized Bed Reactor; 3.3.5.3 Flow in a Fixed Bed Catalytic Reactor; 3.3.6 Flow Modelling using Computational Fluid Dynamics; 3.4 Complex Models and Their Simulators; 3.4.1 Problem of Heating in a Zone Refining Process; 3.4.2 Heat Transfer in a Composite Medium; 3.4.3 Fast Chemical Reaction Accompanied by Heat and Mass Transfer; 3.5 Some Aspects of Parameters Identification in Mathematical Modelling; 3.5.1 The Analytical Method for Identifying the Parameters of a Model
3.5.1.1 The Pore Radius and Tortuosity of a Porous Membrane for Gas Permeation

Sommario/riassunto

A description of the use of computer aided modeling and simulation in the development, integration and optimization of industrial processes. The two authors elucidate the entire procedure step-by-step, from basic mathematical modeling to result interpretation and full-scale process performance analysis. They further demonstrate similitude comparisons of experimental results from different systems as a tool for broadening the applicability of the calculation methods. Throughout, the book adopts a very practical approach, addressing actual problems and projects likely to be encountered by the
