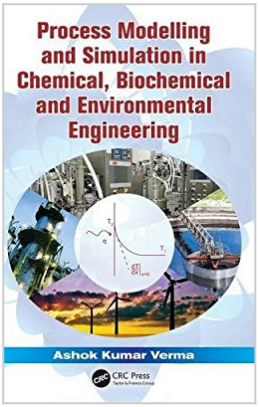

Process Modelling and Simulation in Chemical, Biochemical and Environmental Engineering

By Ashok Kumar Verma

Process Modelling and Simulation in Chemical, Biochemical and Environmental Engineering By Ashok Kumar Verma

The use of simulation plays a vital part in developing an integrated approach to process design. By helping save time and money before the actual trial of a concept, this practice can assist with troubleshooting, design, control, revamping, and more. **Process Modelling and Simulation in Chemical, Biochemical and Environmental Engineering** explores effective modeling and simulation approaches for solving equations. Using a systematic treatment of model development and simulation studies for chemical, biochemical, and environmental processes, this book explains the simplification of a complicated process at various levels with the help of a "model sketch."

It introduces several types of models, examines how they are developed, and provides examples from a wide range of applications. This includes the simple models based on simple laws such as Fick’s law, models that consist of generalized equations such as equations of motion, discrete-event models and stochastic models (which consider at least one variable as a discrete variable), and models based on population balance.

Divided into 11 chapters, this book:

- Presents a systematic approach of model development in view of the simulation need
- Includes modeling techniques to model hydrodynamics, mass and heat transfer, and reactors for single as well as multi-phase systems
- Provides stochastic and population balance models
- Covers the application and development of artificial neural network models and hybrid ANN models
- Highlights gradients based techniques as well as statistical techniques for model validation and sensitivity analysis
- Contains examples on development of analytical, stochastic, numerical, and ANN-based models and simulation studies using them
- Illustrates modeling concepts with a wide spectrum of classical as well as

recent research papers

Process Modelling and Simulation in Chemical, Biochemical and Environmental Engineering includes recent trends in modeling and simulation, e.g. artificial neural network (ANN)-based models, and hybrid models. It contains a chapter on flowsheeting and batch processes using commercial/open source software for simulation.

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Process Modelling and Simulation in Chemical, Biochemical and Environmental Engineering By Ashok Kumar Verma Bibliography

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Editorial Review

Review

"Overall, the material covered is good. The need for mathematical modeling and simulation, the basic steps involved in the development of mathematical modeling and simulation, and validation of the models are highlighted a systematic way. For large number of situations, the associated mathematical model equations with the relevant boundary conditions/initial conditions are given. The analytical solutions, wherever possible, are given. For situations requiring numerical solutions, MATLAB® programs are given. There is a good presentation of the subject materials. The book can be recommended for two courses: one at the undergraduate level (chapters 1 to 4 and 9), and one at the post-graduate level (chapters 5 to 11)."
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?Alirio E. Rodrigues, The Faculdade de Engenharia da Universidade do Porto, Portugal

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Ashok Kumar Verma is a professor in the Department of Chemical Engineering and Technology at the Indian Institute of Technology (Banaras Hindu University) Varanasi. He holds a BSc from Allahabad University, a BE in chemical engineering from University of Roorkee (now Indian Institute of Technology, Roorkee), an ME in chemical engineering from the Indian Institute of Sciences, Bangalore, and a PhD in chemical engineering from the Indian Institute of Technology, Kanpur. Dr. Verma joined the Institute of Technology, Banaras Hindu University, Varanasi in 1984. Dr. Verma has authored or co-authored numerous papers in journals, and national and international proceedings.

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