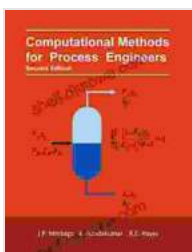


Computational Methods for Process Engineers: A Comprehensive Guide to Process Modeling and Simulation

Computational methods have become increasingly important in process engineering. They allow engineers to model and simulate complex processes, which can help them to design and optimize new processes, troubleshoot existing processes, and train operators.



Computational Methods for Process Engineers

by George R. Exner

★★★★★ 5 out of 5

Language	: English
Paperback	: 283 pages
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This book provides a comprehensive guide to the latest computational methods used in process engineering. It covers a wide range of topics, including:

* Process modeling * Simulation * Optimization * Control

The book is written by a team of experts with over 50 years of combined experience in the field. They have written the book in a clear and concise style, making it easy to understand even for those who are new to computational methods.

Process Modeling

Process modeling is the first step in any computational study. It involves creating a mathematical model of the process that you want to study. The model can be as simple or as complex as you need it to be. The more complex the model, the more accurate the results will be, but the more time and resources it will take to develop.

There are a number of different process modeling techniques available. The most common technique is lumped-parameter modeling. This technique assumes that the process is well-mixed and that there are no spatial variations in the process variables. Other modeling techniques include distributed-parameter modeling, finite-element modeling, and computational fluid dynamics (CFD).

Once you have developed a process model, you can use it to simulate the process. Simulation is the process of running the model to predict how the process will behave under different conditions. Simulation can be used to:

* Design new processes * Optimize existing processes * Troubleshoot existing processes * Train operators

Optimization

Optimization is the process of finding the best possible solution to a problem. In process engineering, optimization is often used to find the best way to operate a process. Optimization can also be used to design new processes or to troubleshoot existing processes.

There are a number of different optimization techniques available. The most common technique is linear programming. This technique is used to solve problems that have a linear objective function and linear constraints. Other optimization techniques include nonlinear programming, mixed-integer programming, and dynamic programming.

Control

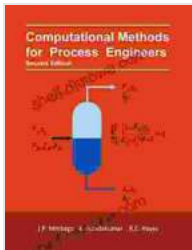
Control is the process of keeping a process running at the desired setpoints. In process engineering, control is often used to maintain the temperature, pressure, and flow rate of a process. Control can also be used to optimize the performance of a process.

There are a number of different control techniques available. The most common technique is proportional-integral-derivative (PID) control. This technique is used to control processes that have a relatively slow response time. Other control techniques include model predictive control (MPC) and fuzzy logic control.

Computational methods are essential for process engineers. They allow engineers to model and simulate complex processes, which can help them to design and optimize new processes, troubleshoot existing processes, and train operators.

This book provides a comprehensive guide to the latest computational methods used in process engineering. It covers a wide range of topics, including process modeling, simulation, optimization, and control. The book is written by a team of experts with over 50 years of combined experience in the field. They have written the book in a clear and concise style, making it easy to understand even for those who are new to computational methods.

If you are a process engineer, then you need this book. It will help you to use computational methods to improve your work.



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