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Nota di contenuto	Cover; Table of Contents; Preface; Chapter 1 Modeling in Process Technology; 1.1 Deterministic Modeling; 1.2 Stochastic modeling-an Example; Chapter 2 Principles of Stochastic Process modeling; 2.1 Stochastic Process Generalities; 2.2 Markov Processes; 2.3 Markov Chains; 2.4 Long-Term Behavior of Markov Chains; 2.5 Diffusion processes; 2.6 First Exit Times and RTD Curves; Chapter 3 Batch Fluidized Beds; 3.1 Flow Regimes; 3.2 Bubbling Beds; 3.3 Slugging Fluidized Beds; 3.4 Stochastic Model Incorporating Interfering Particles; Chapter 4 Continuous Systems and RTD; 4.1 Theory of Danckwerts 4.2 Subsequent Work4.3 Danckwerts' Law Revisited; 4.4 RTD for Complex Systems; Chapter 5 RTD in Continuous Fluidized Beds; 5.1 Types of beds considered here; 5.2 Bubbling bed; 5.3 Fluidized Bed Riser; Chapter 6 Mixing and Reactions; 6.1 Network-of-Zones Modeling; 6.2 Modeling of Chemical Reactions; Chapter 7 Particle Size Manipulation; 7.1 Physical Phenomena; 7.2 Principles of PBM; 7.3 PBM for High-Shear Granulation; 7.4 Analysis of a Grinding Process; Chapter 8 Multiphase Systems; 8.1 Multiphase System for Bubbling Bed; 8.2 Gulf Streaming in Fluidized beds

8.3 Extension of the Model to include Gulf Streaming; 8.4 Quantification of the Model Parameters; 8.5 Model Validation with Data; 8.6 Review of Too et al.; 8.7 Danckwerts' law for a Multiphase Systems; 8.8 The abstract Multiphase System; Chapter 9 Diffusion Limits; 9.1 Fokker-Planck equation; 9.2 Limit Process; Appendix A Equations for RTD in CSTR and DPF; A.1 Ideally Mixed Vessels (CSTRs) in Series; A.2 Plug Flow with Axial Dispersion; Bibliography; Index; Mathematics in Science and Engineering

Sommario/riassunto

There is an ever increasing need for modelling complex processes reliably. Computational modelling techniques, such as CFD and MD may be used as tools to study specific systems, but their emergence has not decreased the need for generic, analytical process models. Multiphase and multicomponent systems, and high-intensity processes displaying a highly complex behaviour are becoming omnipresent in the processing industry. This book discusses an elegant, but little-known technique for formulating process models in process technology: stochastic process modelling. The technique is based on
