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Particles: Review of Basic Concepts and Models; 3.1 Introduction; 3.2 Soft-Sphere Model; 3.2.1 Numerical Implementation
3.2.1.1 Contact Forces3.2.1.2 Collision Parameters; 3.2.1.3 Contact Detection; 3.2.1.4 Time Integration; 3.2.2 Validation Cases; 3.2.2.1 Free-Falling Particle; 3.2.2.2 Analytic Solution for the Free-falling Particle; 3.2.2.3 Slipping Sphere on a Rough Surface; 3.2.3 Illustrative Examples; 3.2.3.1 Breaking Dam Problem; 3.2.3.2 Rotating Drum; 3.2.3.3 Generation of Fixed Beds; 3.3 Hard-Sphere Model; 3.3.1 Governing Equations; 3.3.2 Collision Treatment in Dense Particulate Systems; 3.3.3 2D Formulation of Hard-Sphere Collisions; 3.3.4 Illustration of Hard-Sphere Models; 3.3.5 Conclusions
NomenclatureReferences; Chapter 4 CD and Nu Closure Relations for Spherical and NonSpherical Particles; 4.1 Literature Review; 4.2 Model Description; 4.2.1 Numerical Scheme and Discretization; 4.3 Code and Software Validation; 4.4 Porous Particles; 4.4.1 Geometry Assumptions; 4.4.2 Heat and Fluid Flow Past Porous Particles; 4.4.3 Drag and Nusselt Numbers for Porous Particles; 4.5 Nonspherical Particles; 4.5.1 Heat and Fluid Flow of Particles Oriented in the Flow Direction; 4.5.2 Flow Characteristics of Particles at Different Angles of Attack
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5.2.2 Porosity

Sommario/riassunto

Bridging the gap between the well-known technological description of gasification and the underlying theoretical understanding, this book covers the latest numerical and semi-empirical models describing interphase phenomena in high-temperature conversion processes. Consequently, it focuses on the description of gas-particle reaction systems by state-of-the-art computational models in an integrated, unified form. Special attention is paid to understanding and modeling the interaction between individual coal particles and a surrounding hot gas, including heterogeneous and homogeneous chemical re