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Integrated Chemical Processes in Liquid Multiphase SystemsFluid-Structure InteractionAlgorithmen und DatenstrukturenFahrdynamikElektrische und magnetische FelderHomogenisierungsmethoden Matthias Kraume Stefan Frei Gunter Saake Martin Schünemann Marco Leone Rainer Glüge Integrated Chemical Processes in Liquid Multiphase Systems Fluid-Structure Interaction Algorithmen und Datenstrukturen Fahrdynamik Elektrische und magnetische Felder Homogenisierungsmethoden *Matthias Kraume Stefan Frei Gunter Saake Martin Schünemann Marco Leone Rainer Glüge*

liquid multiphase processes represent a promising option for realizing novel efficient and sustainable production processes as required for the transformation towards climate neutral manufacturing processes this volume presents the results obtained over twelve years in the dfg funded collaborative project transregio 63 integrated chemical processes in liquid multiphase systems in an interdisciplinary approach to the design and operation of such processes essential principles of green chemistry are realized such as using long chain olefins as model representatives of renewable raw materials highly effi cient catalysts and green solvents linked with process optimization to improve energy and material efficiency experts from different fields addressed all steps of the development process from the description of the reactions on the molecular level via thermodynamics and the design of efficient separation processes to the operation of entire miniplants for liquid multiphase production processes thus the complete development chain from the first reaction related investigations in the laboratory to the technological realization in miniplants with model based control is demonstrated numerous methodological innovations are proposed and validated using several innovative phase systems thermomorphic multiphase systems microemulsion systems pickering emulsions and homogeneously catalyzed reactions engineers and chemists from the chemical industry as well as advanced students and researchers will get valuable insights into the physico chemical phenomena in chemical multiphase processes and benefit from recommendations concerning methods for the selection of phase systems and rapid model based process development

this monograph discusses modeling adaptive discretisation techniques and the numerical solution of fluid structure interaction an emphasis in part i lies on innovative discretisation and advanced interface resolution techniques the second part covers the efficient and robust numerical solution of fluid structure interaction in part iii recent advances in the application fields vascular flows binary fluid solid interaction and coupling to fractures in

the solid part are presented moreover each chapter provides a comprehensive overview in the respective topics including many references to concurring state of the art work contents part i modeling and discretization on the implementation and benchmarking of an extended ale method for fsi problems the locally adapted parametric finite element method for interface problems on triangular meshes an accurate eulerian approach for fluid structure interactions part ii solvers numerical methods for unsteady thermal fluid structure interaction recent development of robust monolithic fluid structure interaction solvers a monolithic fsi solver applied to the fsi 1 2 3 benchmarks part iii applications fluid structure interaction for vascular flows from supercomputers to laptops binary fluid solid interaction based on the navier stokes cahn hilliard equations coupling fluid structure interaction with phase field fracture algorithmic details

algorithmen und datenstrukturen von grund auf verstehen fundierte einführung mit klarem didaktischen aufbau mit konkreten anwendungsbeispielen eine reichhaltige fundgrube für lehre und selbststudium kenntnisse von algorithmen und datenstrukturen sind ein grundbaustein des studiums der informatik und verwandter fachrichtungen das buch behandelt diese thematik in verbindung mit der programmiersprache java und schlägt so eine brücke zwischen den klassischen lehrbüchern zur theorie von algorithmen und datenstrukturen und den praktischen einführungen in eine konkrete programmiersprache die konkreten algorithmen und deren realisierung in java werdenumfassend dargestellt daneben werden die theoretischen grundlagen vermittelt die in programmiersprachen kursen oft zu kurz kommen abstrakte maschinenmodelle berechenbarkeit algorithmenparadigmen sowie parallele und verteilte abläufe einen weiteren schwerpunkt bilden datenstrukturen wie listen bäume graphen und hashtabellen sowie deren objektorientierte implementierung mit modernen methoden der softwareentwicklung die 6 auflage führt einige neue algorithmen ein und berücksichtigt die neuerungen der aktuellen java versionen u a zu themen wie parallelisierung

mit dem einsatz innovativer technik gewinnt das elektrofahrzeug an bedeutung für ambitionierte klimaschutzziele das buch zeigt ein dreigliedriges hierarchisches konzept zur fahrdynamikregelung für elektrofahrzeuge mit einzelradantrieben die nutzung der auf den drei ebenen fahrer einzelrad gesamtfahrzeug gewonnenen daten erlaubt eine hochdynamische präzise und energieeffiziente regelung der fahrzeugdynamik

aus wenigen physikalischen grundtatsachen wird die theorie des elektromagnetismus schrittweise aufgebaut mit sowenig mathematik wie möglich vektoralgebra differential u integralrechnung im raum werden die grundlegenden begriffe und gesetze eingeführt und an zahlreichen vollständig durchgerechneten beispielen angewandt optimale prüfungsvorbereitung durch vertiefende Übungsaufgaben mit lösungen

fast alle materialien weisen eine mikrostruktur auf die bei ingenieurmäßigen berechnungsaufgaben nicht im detail berücksichtigt werden können daher wurden homogenisierungsmethoden entwickelt die aus der mikrostruktur und phaseneigenschaften effektive eigenschaften ableiten dieses

buch gibt einen einstieg in dieses umfangreiche thema die wichtigsten methoden werden präsentiert und mit programmierten beispielen untermauert

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