

Numerical Simulation of Reactive Flow

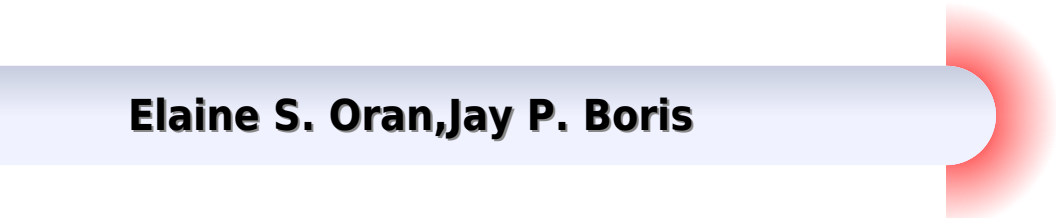
Second Edition



ELAINE S. ORAN
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Numerical Simulation Of Reactive Flow

Elaine S. Oran, Jay P. Boris



Numerical Simulation Of Reactive Flow:

Numerical Simulation of Reactive Flow Elaine S. Oran, Jay P. Boris, 1987 This new edition takes account of the explosive growth in computer technology and the greatly increased capacity for solving complex reactive flow problems It presents algorithms for reactive flow simulations describes some trade offs involved in their use and gives guidance for building and using models of complex reactive flows

Numerical Simulation of Reactive Flow Elaine S. Oran, Jay P. Boris, 2005-11-10 Reactive flows encompass a broad range of physical phenomena interacting over many different time and space scales Such flows occur in combustion chemical lasers the earth's oceans and atmosphere and in stars Because of a similarity in their descriptive equations procedures for constructing numerical models of these systems are also similar and these similarities can be exploited Moreover using the latest technology what were once difficult and expensive computations can now be done on desktop computers This new edition of a highly successful book presents algorithms useful for reactive flow simulations describes trade offs involved in their use and gives guidance for building and using models of complex reactive flows It takes account of the explosive growth in computer technology and the greatly increased capacity for solving complex reactive flow problems that has occurred since the previous edition was published more than fifteen years ago An indispensable guide on how to construct use and interpret numerical simulations of reactive flows this book will be welcomed by advanced undergraduate and graduate students and a wide range of researchers and practitioners in engineering physics and chemistry

Modeling and Simulation of Reactive Flows A.L. De Bortoli, Greice Andreis, Felipe Pereira, 2015-07-10 Modelling and Simulation of Reactive Flows presents information on modeling and how to numerically solve reactive flows The book offers a distinctive approach that combines diffusion flames and geochemical flow problems providing users with a comprehensive resource that bridges the gap for scientists engineers and the industry Specifically the book looks at the basic concepts related to reaction rates chemical kinetics and the development of reduced kinetic mechanisms It considers the most common methods used in practical situations along with equations for reactive flows and various techniques including flamelet ILDM and Redim for jet flames and plumes with solutions for both In addition the book includes techniques to accelerate the convergence of numerical simulation and a discussion on the analysis of uncertainties with numerical results making this a useful reference for anyone who is interested in both combustion in free flow and in porous media Helps readers learn how to apply applications of numerical methods to simulate geochemical kinetics Presents methods on how to transform the transport equations in several coordinate systems Includes discussions of the basic concepts related to reaction rates chemical kinetics and the development of reduced kinetic mechanisms including the most common methods used in practical situations Offers a distinctive approach that combines diffusion flames and geochemical flow problems

Numerical Simulation of Reactive Flow in Hot Aquifers Christoph Clauser, 2012-12-06 This product consisting of a CD ROM and a book deals with the numerical simulation of reactive transport in porous media using the simulation package

SHEMAT Processing SHEMAT SHEMAT Simulator for HEat and MAss Transport is an easy to use general purpose reactive transport simulation code for a wide variety of thermal and hydrogeological problems in two or three dimensions The book is a richly documented manual for users of this software which discusses in detail the coded physical and chemical equations Thus it provides the in depth background required by those who want to apply the code for solving advanced technical and scientific problems The enclosed companion CD ROM contains the software and data for all of the case studies The software includes user friendly pre and post processors which make it very easy to set up a model run it and view the results all from one platform Therefore the software is also very suitable for academic or technical hands on courses for simulating flow transport of heat and mass and chemical reactions in porous media You can find a link to the updated software on springer.com

Numerical Simulation of Reactive Flow and Transport Through the Subsurface Ashok Kumar

Chilakapati,1993

Numerical Simulation of Reactive Flow Associated with a Lobed Fuel Injector Thomas

Selerland,1997

Reactive Flows, Diffusion and Transport Willi Jäger,Rolf Rannacher,J. Warnatz,2009-09-02 The articles in this volume summarize the research results obtained in the former SFB 359 Reactive Flow Diffusion and Transport which has been supported by the DFG over the period 1993 2004 The main subjects are physical chemical processes sharing the difficulty of interacting diffusion transport and reaction which cannot be considered separately The modeling and simulation within this book is accompanied by experiments

Numerical Simulation of Reactive Flow in Internal Combustion Engines.

[CONCHAS-SPRAY Code]. ,1980 Multidimensional numerical simulations of the reactive fluid flow in an internal combustion engine cylinder are useful in helping engine designers obtain insight into the physical mechanisms governing efficiency and pollutant formation A comprehensive numerical model for internal combustion engine cylinder simulations that has been developed at Los Alamos is described The model is currently embodied in a two dimensional axisymmetric computer code called CONCHAS SPRAY Work is in progress on a three dimensional code with the same features

Numerical Simulation of Reactive Flow on the IBM ES-3090 Vector Multiprocessor Friedrich-Karl Hebeker,Rudolf Maly,Stefan

Schöffel,1992

Direct Numerical Simulation for Turbulent Reacting Flows Thierry Baritaud,Thierry Poinot,Markus

Baum,1996

Contents Description of accurate boundary conditions for the simulation of reactive flows Parallel direct numerical simulation of turbulent reactive flow Flame wall interaction and heat flux modelling in turbulent channel flow A numerical study of laminar flame wall interaction with detailed chemistry wall temperature effects Modeling and simulation of turbulent flame kernel evolution Experimental and theoretical analysis of flame surface density modelling for premixed turbulent combustion Gradient and counter gradient transport in turbulent premixed flames Direct numerical simulation of turbulent flames with complex chemical kinetics Effects of curvature and unsteadiness in diffusion flames Implications for turbulent diffusion combustion Numerical simulations of autoignition in turbulent mixing flows Stabilization processes of diffusion flames References

Reactive Flows, Diffusion and Transport Willi Jäger,Rolf Rannacher,J. Warnatz,2006-10-16

The articles in this volume summarize the research results obtained in the former SFB 359 Reactive Flow Diffusion and Transport which has been supported by the DFG over the period 1993 2004 The main subjects are physical chemical processes sharing the difficulty of interacting diffusion transport and reaction which cannot be considered separately The modeling and simulation within this book is accompanied by experiments

Numerical Simulation of Reactive Flows with Detailed Reaction Schemes on Unstructured Grids U. Riedel,1998 *Numerical Simulation of Multi-phase Multi-component Reactive Flow in Porous Media* ,2015 *The Numerical Simulation of Compressible Reactive Flows* J. P. Boris,1987 **Numerical Simulation and Experimental Investigation of Reactive Flow in a Carbonate Reservoir** Farhana Jaafar Azuddin,2022 *Numerical Simulation of Reactive Polymer Flow* Craig D. Douglas,1983 Numerical Simulation of Hypersonic Equilibrium-air Reactive Flow Jean-Antoine Désidéri,Elie Hettena,1987 Reactive Flows, Diffusion and Transport Willi Jäger,Rolf Rannacher,J. Warnatz,2007-05-31

The articles in this volume summarize the research results obtained in the former SFB 359 Reactive Flow Diffusion and Transport which has been supported by the DFG over the period 1993 2004 The main subjects are physical chemical processes sharing the difficulty of interacting diffusion transport and reaction which cannot be considered separately Typical examples are the chemical processes in flow reactors and in the catalytic combustion at surfaces Further examples are models of star formation including diffusive mass transport energy radiation and dust formation and the polluting transport in soil and waters For these complex processes mathematical models are established and numerically simulated The modeling uses multiscale techniques for nonlinear differential equations while for the numerical simulation and optimization goal oriented mesh and model adaptivity multigrid techniques and advanced Newton type methods are developed combined with parallelization This modeling and simulation is accompanied by experiments

Computational Fluid Dynamics T. J. Chung,2002-02-07 Increasingly computational fluid dynamics CFD techniques are being used to study and solve complex fluid flow and heat transfer problems This comprehensive book ranges from elementary concepts for the beginner to state of the art CFD for the practitioner It begins with CFD preliminaries in which the basic principles of finite difference FD finite element FE and finite volume FV methods are discussed and illustrated through examples with step by step hand calculations Then FD and FE methods respectively are covered including both historical developments and recent contributions The next section is devoted to structured and unstructured grids adaptive methods computing techniques and parallel processing Finally the author describes a variety of practical applications to problems in turbulence reacting flows and combustion acoustics combined mode radiative heat transfer multiphase flows electromagnetic fields and relativistic astrophysical flows Students and practitioners particularly in mechanical aerospace chemical and civil engineering will use this authoritative text to learn about and apply numerical techniques to the solution of fluid dynamics problems

Computational Flow Modeling for Chemical Reactor Engineering Vivek V. Ranade,2002 The book relates the individual aspects of chemical reactor engineering and

computational flow modeling in a coherent way to explain the potential of computational flow modeling for reactor engineering research and practice

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