

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

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 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 **Direct**

Numerical Simulation for Turbulent Reacting Flows Thierry Baritaud,Thierry Poinso,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 *Numerical Simulation of Reactive Flow on the IBM ES-3090 Vector Multiprocessor* Friedrich-Karl Hebekker,Rudolf Maly,Stefan Schöffel,1992

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