



# Modeling and Simulation of Reactive Flows

By A.L. De Bortoli, Greice Andreis, Felipe Pereira

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**Modeling and Simulation of Reactive Flows** By A.L. De Bortoli, Greice Andreis, Felipe Pereira

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

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### Bibliography

- Sales Rank: #3363098 in Books
- Published on: 2015-07-17
- Released on: 2015-07-03
- Original language: English
- Number of items: 1
- Dimensions: 9.00" h x .48" w x 6.00" l, .75 pounds
- Binding: Paperback
- 212 pages



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## **Editorial Review**

### **About the Author**

Prof. De Bortoli acquired good numerical experience at the DLR, Deutsches Zentrum für Luft- und Raumfahrt, Braunschweig, Germany, during part of his doctorate, and gained experience in combustion during his postdoctoral work performed at ITV, Institut für Technische Verbrennung, RWTH, Aachen, Germany. Professor De Bortoli has experience in solving geochemical fluxes acquired during his development of the Petrobras (Oil Company of Brazil). In addition, he oversaw about 30 Dissertations, 10 Ph.D.s and 3 post-doctoral works at Graduate Programs in both Applied Mathematics and Chemical Engineering.

Prof. G.S.L. Andreis has experience developing models and numerical simulation obtained during her Ph.D. and post-doctoral work in Chemical Engineering under the supervision of Prof. De Bortoli.

F.N. Pereira is finishing his Ph.D. in the Development of analytical-numerical solutions for bioethanol turbulent jet diffusion flames, under the supervision of Prof. Álvaro L. de Bortoli.

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