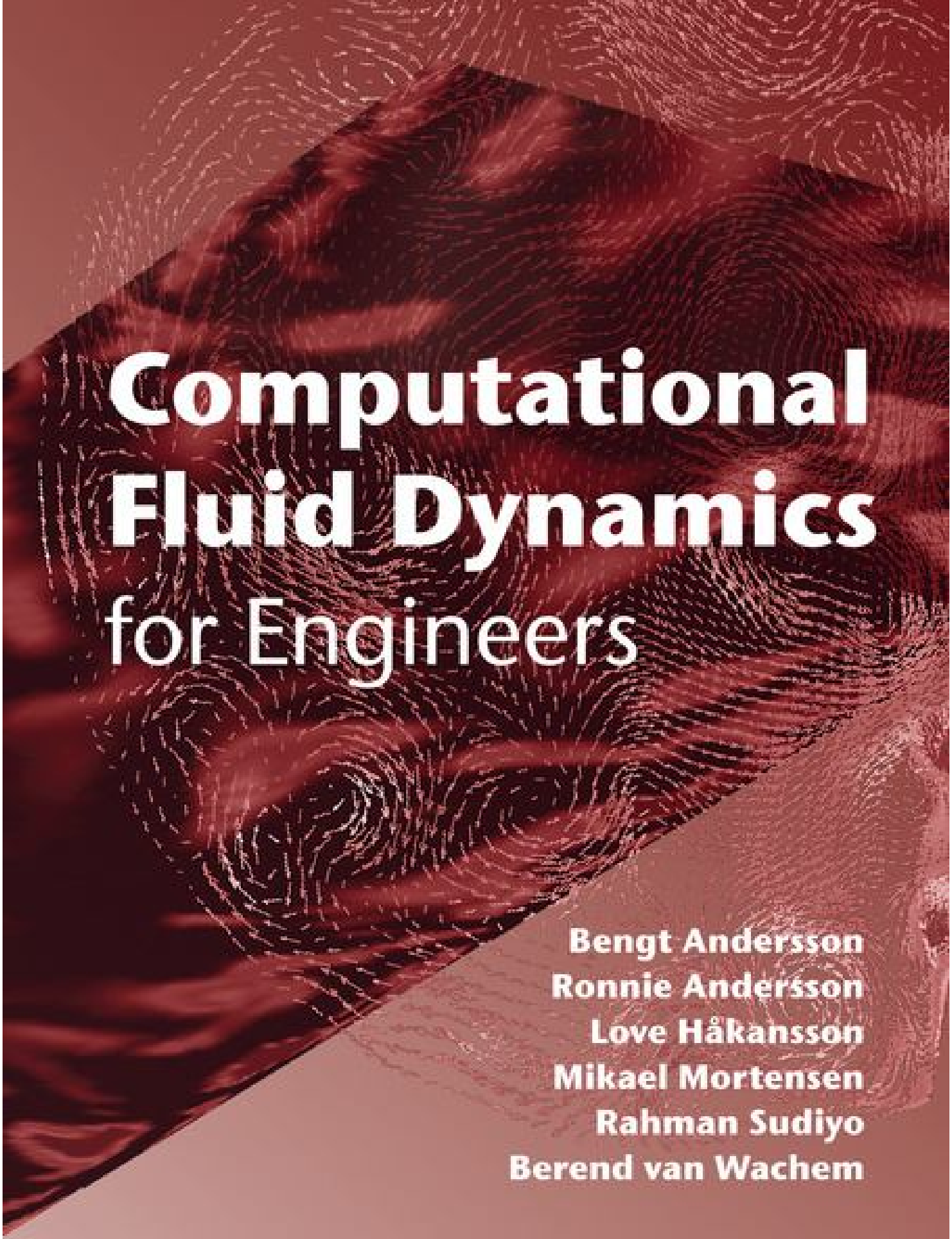

Computational Fluid Dynamics for Engineers

Bengt Andersson
Ronnie Andersson
Love Håkansson
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CAMBRIDGE

Computational Fluid Dynamics for Engineers

Computational fluid dynamics (CFD) has become an indispensable tool for many engineers. This book gives an introduction to CFD simulations of turbulence, mixing, reaction, combustion and multiphase flows. The emphasis on understanding the physics of these flows helps the engineer to select appropriate models with which to obtain reliable simulations. Besides presenting the equations involved, the basics and limitations of the models are explained and discussed. The book, combined with tutorials, project and Power-Point lecture notes (all available for download), forms a complete course. The reader is given hands-on experience of drawing, meshing and simulation. The tutorials cover flow and reactions inside a porous catalyst, combustion in turbulent non-premixed flow and multiphase simulation of evaporating sprays. The project deals with the design of an industrial-scale selective catalytic reduction process and allows the reader to explore various design improvements and apply best practice guidelines in the CFD simulations.

Bengt Andersson is a Professor in Chemical Engineering at Chalmers University, Sweden. His research has focused on experimental studies and modelling of mass and heat transfer in various chemical reactors ranging from automotive catalysis to three-phase flow in chemical reactors.

Ronnie Andersson is an Assistant Professor in Chemical Engineering at Chalmers University. He obtained his PhD at Chalmers in 2005 and from 2005 until 2010 he worked as a consultant at Epsilon HighTech as a specialist in CFD simulations of combustion and multiphase flows. His research projects involve physical modelling, fluid-dynamic simulations and experimental methods.

Love Håkansson works as a consultant at Engineering Data Resources – EDR in Oslo, Norway. His research has been in mass transfer in turbulent boundary layers. He is now working on simulations of single-phase and multiphase flows.

Mikael Mortensen obtained his PhD at Chalmers University in 2005 in turbulent mixing with chemical reactions. After two years as a post doc at the University of Sydney, he is now working with fluid dynamics at the Norwegian Defence Research Establishment in Lillehammer, Norway.

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Berend van Wachem is a Reader at Imperial College London in the UK. His research projects involve multiphase flow modelling, ranging from understanding the behaviour of turbulence on the scale of individual particles to the large-scale modelling of gas–solid and gas–liquid flows.

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