

ESSENTIALS OF COMPUTATIONAL FLUID DYNAMICS



Jens-Dominik Müller

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Essentials of Computational Fluid Dynamics Jens-Dominik Mueller, 2015-11-04 Covered from the vantage point of a user of a commercial flow package **Essentials of Computational Fluid Dynamics** provides the information needed to competently operate a commercial flow solver This book provides a physical description of fluid flow outlines the strengths and weaknesses of computational fluid dynamics CFD presents the basics of

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Dynamics 2003 Boris Chetverushkin, Jacques Periaux, N. Satofuka, A. Ecer, 2004-05-06 The book is devoted to using of parallel multiprocessor computer systems for numerical simulation of the problems which can be described by the equations of continuum mechanics Parallel algorithms and software the problems of meta computing are discussed in details some results of high performance simulation of modern gas dynamic problems combustion phenomena plasma physics etc are presented Parallel Algorithms for Multidisciplinary Studies

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Computational Fluid Dynamics and Energy Modelling in Buildings

Parham A. Mirzaei, 2023-01-24 COMPUTATIONAL FLUID DYNAMICS AND ENERGY MODELLING IN BUILDINGS A Comprehensive Overview of the Fundamentals of Heat and Mass Transport Simulation and Energy Performance in Buildings In the first part of Computational Fluid Dynamics and Energy Modelling in Buildings Fundamentals and Applications the author explains the fundamentals of fluid mechanics thermodynamics and heat transfer with a specific focus on their application in buildings This background knowledge sets the scene to further model heat and mass transport in buildings with explanations of commonly applied simplifications and assumptions In the second part the author elaborates how the fundamentals explained in part 1 can be used to model energy flow in buildings which is the basis of all commercial and educational building energy simulation tools An innovative illustrative nodal network concept is introduced to help readers comprehend the basics of conservation laws in buildings The application of numerical techniques to form dynamic simulation tools are then introduced In general understanding these techniques will help readers to identify and justify their choices when working with building energy simulation tools rather than using default settings Detailed airflow information in buildings cannot be obtained in building energy simulation techniques Therefore part three is focused on introducing computational fluid dynamics CFD as a detailed modelling technique for airflow in buildings This part starts with an introduction to the fundamentals of the finite

volume method used to solve the governing fluid equations and the related challenges and considerations are discussed The last chapter of this part covers the solutions to some practical problems of airflow within and around buildings The key aspect of Computational Fluid Dynamics and Energy Modelling in Buildings Fundamentals and Applications is that it is tailored for audiences without extensive past experience of numerical methods Undergraduate or graduate students in architecture urban planning geography architectural engineering and other engineering fields along with building performance and simulation professionals can use this book to gain additional clarity on the topics of building energy simulation and computational fluid dynamics

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