



# High-Order Methods for Incompressible Fluid Flow (Cambridge Monographs on Applied and Computational Mathematics)

*M. O. Deville, P. F. Fischer, E. H. Mund*

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### High-Order Methods for Incompressible Fluid Flow (Cambridge Monographs on Applied and Computational Mathematics)

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High-order numerical methods provide an efficient approach to simulating many physical problems. This book considers the range of mathematical, engineering, and computer science topics that form the foundation of high-order numerical methods for the simulation of incompressible fluid flows in complex domains. Introductory chapters present high-order spatial and temporal discretizations for one-dimensional problems. These are extended to multiple space dimensions with a detailed discussion of tensor-product forms, multi-domain methods, and preconditioners for iterative solution techniques. Numerous discretizations of the steady and unsteady Stokes and Navier-Stokes equations are presented, with particular attention given to enforcement of incompressibility. Advanced discretizations, implementation issues, and parallel and vector performance are considered in the closing sections. Numerous examples are provided throughout to illustrate the capabilities of high-order methods in actual applications. Computer scientists, engineers and applied mathematicians interested in developing software for solving flow problems will find this book a valuable reference.



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