The Finite Element Method for Fluid Dynamics, Seventh Edition

By Olek C Zienkiewicz, Robert L Taylor, P. Nithiarasu

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The Finite Element Method for Fluid Dynamics offers a complete introduction the application of the finite element method to fluid mechanics. The book begins with a useful summary of all relevant partial differential equations before moving on to discuss convection stabilization procedures, steady and transient state equations, and numerical solution of fluid dynamic equations.

The character-based split (CBS) scheme is introduced and discussed in detail, followed by thorough coverage of incompressible and compressible fluid dynamics, flow through porous media, shallow water flow, and the numerical treatment of long and short waves. Updated throughout, this new edition includes new chapters on:

- Fluid-structure interaction, including discussion of one-dimensional and multidimensional problems.
- Biofluid dynamics, covering flow throughout the human arterial system.

Focusing on the core knowledge, mathematical and analytical tools needed for successful computational fluid dynamics (CFD), *The Finite Element Method for Fluid Dynamics* is the authoritative introduction of choice for graduate level students, researchers and professional engineers.

- A proven keystone reference in the library of any engineer needing to understand and apply the finite element method to fluid mechanics.
- Founded by an influential pioneer in the field and updated in this seventh edition by leading academics who worked closely with Olgierd C. Zienkiewicz.
- Features new chapters on fluid-structure interaction and biofluid dynamics, including coverage of one-dimensional flow in flexible pipes and challenges in modeling systemic arterial circulation.

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Review
"...this is a book that you simply cannot afford to be without."--INTERNATIONAL JOURNAL OF NUMERICAL METHODS IN ENGINEERING (previous edition)

From the Back Cover

The classic fluid mechanics FEM reference that no serious engineer concerned with finite elements should be without

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About the Author
O. C. Zienkiewicz was one of the early pioneers of the finite element method and is internationally recognized as a leading figure in its development and wide-ranging application. He was awarded numerous honorary degrees, medals and awards over his career, including the Royal Medal of the Royal Society and Commander of the British Empire (CBE). He was a founding author of The Finite Element Method books and developed them through six editions over 40 years up to his death in 2009.

R. L. Taylor is Emeritus Professor of Engineering and Professor in the Graduate School, Department of Civil and Environmental Engineering at the University of California, Berkeley.

Dr. P. Nithiarasu, Senior Lecturer at the School of Engineering, University of Wales Swansea, has over ten years of experience in the finite element based computational fluid dynamics research. He moved to Swansea in 1996 after completing his PhD research at IIT Madras. He was awarded Zienkiewicz silver medal and prize of the Institution of Civil Engineers, UK in 2002. In 2004 he was selected to receive the European Community on Computational Methods in Applied Sciences (ECCOMAS) award for young scientists in computational engineering sciences. Dr Nithiarasu is the author of several articles in the area of fluid dynamics, porous medium flows and the finite element method.

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