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Vortex Element Methods for Fluid Dynamic Analysis of Engineering Systems (Hardback)

By R. I. Lewis

CAMBRIDGE UNIVERSITY PRESS, United Kingdom, 2003.
 Hardback. Book Condition: New. New.. 236 x 161 mm.
 Language: English . Brand New Book ***** Print on Demand *****.
 This book deals with advanced fluid flow methods for design and analysis of engineering systems. Panel methods employing surface distributions of source and vortex singularities based on the solution of boundary integral equations have been extensively used for modelling external and internal aerodynamic flows. Part 1 describes the surface vorticity method and illustrates applications of this technique over a wide range of engineering problems in aerodynamics and turbo-machines, including lifting aerofoils and cascades, mixed-flow and rotating cascades for fans, pumps or turbines, meridional flows in turbo-machines, flow past axisymmetric bodies, ducts and ducted propellers or fans. Part 2 extends surface vorticity modelling to the fairly new CFM field of vortex dynamics or vortex cloud theory, including foundation chapters on convection and viscous diffusion by the random walk technique. Vortex cloud methods are developed, again from first principles, to deal with shear layers, boundary layers, periodic wakes, bluff-body flows, cascades and aerofoils including the use of stall control spoilers. A number of useful computer programs are included.



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