Contents

Preface v

Vortex Element Methods, the Most Natural Approach to Flow Simulation — A Review of Methodology with Applications 1
R. I. Lewis

A Hybrid Vortex Method 16
J. Michael R. Graham and Richard H. Arkell

Transient Flow around a Circular Cylinder near the Moving and Rigid Ground by a Vortex Method 28
Teruhiko Kida and Takanori Take

Numerical Simulation of Unsteady Flow around a Sphere by a Vortex Method for Re Number from 300 to 1000 36
Akira Ojima and Kyoji Kamemoto

Flows around 2D Circular and Elliptic Cylinders using New Scheme for Vorticity Production at Solid Surface 44
Yuji Nakanishi, Koichi Tobita, Naoto Hagihara and Mamoru Kubokawa

Two-Dimensional Transient Flows around a Rectangular Cylinder by a Vortex Method 50
Masahiro Otsuka, Teruhiko Kida, Mitsufumi Wada and Mitsuo Kurata

Simulation of Three Dimensional Separated Flow around an Ellipsoid by Discrete Vortex Method 57
M. Fevzi Unal and Kyoji Kamemoto

Numerical Simulation of Vortex Shedding from an Oscillating Circular Cylinder Using a Discrete Vortex Method 63
J. R. Meneghini, F. Saltara and C. R. Siqueira

Numerical Study on Interaction Processes and Sequences in Bistable Flow Regime of Two Circular Cylinders 74
C. W. Ng and Norman W. M. Ko

Vortex Method Analysis of Turbulent Flows 79
Peter S. Bernard, Athanassios A. Dimas and Isaac Lottati

Dynamics of Coherent Structures in a Forced Round Jet 92
S. Izawa, H. Ishikawa and M. Kiya

Application of Discrete Vortex Method as Turbulent Modelling Tool for Local Eddy Generation in Coastal Waters 100
Keita Furukawa, Tadashi Hibino and Munehiro Nomura

Unsteady Aerodynamic Forces Acting on a Large Flat Floating Structure 108
Hiroki Tanaka, Kazuhiro Tanaka, Fumio Shimizu and Youhachirou Watanabe

Convergence Study for the Vortex Method with Boundaries 115
Lung-an Ying

3D Vortex Methods: Achievements and Challenges 123
G. H. Cottet

Development of a Vortex and Heat Elements Method and its Application to Analysis of Unsteady Heat Transfer around a Circular Cylinder in a Uniform Flow 135
Kyoji Kamemoto and Toji Miyasaka

A Vortex Method for Heat-Vortex Interaction and Fast Summation Technique 145
Yoshifumi Ogami

Three-dimensional Vortex Method Using the Ferguson Spline 153
Michihisa Tsutahara, Akira Miura, Kazuhiko Ogawa and Katsuhiko Akita

Numerical Simulation of Gas-Solid Two-Phase Free Turbulent Flow by a Vortex Method 161
Tomomi Uchiyama, Kiyoshi Minemura, Masaaki Naruse and Hikari Arai

Simulation of Particulate Flows Using Vortex Methods 169
Jeans H. Walther, Julian T. Sagredo and Petros Koumoutsakos

Numerical Prediction of Rotor Tip-Vortex Roll-Up in Axial Flights by Using a Time-Marching Free-Wake Method 177
Duck Joo Lee

Experiments and 2D Linear Stability Analysis of the Behavior of Flexible Thin Sheets Cantilevered at the Trailing Edge in a Uniform Flow 188
Kazuhiko Yokota, Masatoshi Yamabayashi, Yoshinobu Tsujimoto and Nobuyuki Yamaguchi

Vortex Element Modelling for the Design and Flow Analysis of Axial, Radial and Mixed-Flow Turbomachines 196
R. Ivan. Lewis

Some Application of Vortex Method to Wind Engineering Problem 204
Hiromichi Shirato and Masaru Matsumoto