

Book Review

Waves and Nonlinear Processes in Hydrodynamics

Edited by J. Grue, B. Gjevik, and J. E. Weber, Kluwer Academic Publishers, Dordrecht, The Netherlands, 1996, 402 pp., \$198.00

This exquisitely produced 402-page book, at a price of about 50 cents per page, reminds us once again that honors and arthritis come with old age, particularly when one retires at the senior-educator age of 70, after many years of a distinguished career in teaching, research, and administration. In this case, the honoree is Prof. Enok Palm of the University of Oslo and the book is a compilation of his biography, two opening lectures, and 29 relatively short invited papers that attempt to take stock of the state of knowledge of various topics in waves and nonlinear processes in hydrodynamics. As noted in the Preface, the topics of the symposium were chosen to cover Enok Palm's broad range of interests in marine hydrodynamics, nonlinear wave theory, nonlinear stability, thermal convection, and geophysical fluid dynamics. The editors have been able to persuade many authoritative engineers, scientists, and distinguished researchers from around the world to contribute to this career-celebration-symposium volume. They have a great deal to say that is timely, thought provoking, and pathfinding. The brevity of the articles enabled the writers to concentrate on the most important aspects of their own past contributions as well as those of others. One does not need much time or patience, or a strong background in each of the highly specialized topics, to see the scope of the state of the art and the principles connecting the diverse and complex phenomena. Books of this nature need not be full length operas on nature's behavior in order to touch upon the diverse interests of its honoree. They should be, as in this case, a series of short performances, masterfully orchestrated into an interesting and informative contribution. Obviously, it is a matter of chance whether one finds among the 29 articles more than 1 or 2 that are of immediate or potential relevance to one's own research. Nevertheless, this is one smorgasbord at which one enjoys not only the food of one's choice but also the more enduring insights of its creators into the nature of physical mechanisms.

This book radiates the warmth and the affection of its authors for Enok Palm as a teacher, scientist, and mentor.

It is also a gift to fluid dynamists with intellectual interest in waves and nonlinear processes in hydrodynamics. It is highly recommended for libraries and for doctoral students in search of mountains to climb, oceans to cross, and new frontiers to conquer.

The titles of the articles and their authors are as follows:

"A Brief Historical Account of Hydrodynamic Research at the University of Oslo" (A. Eliassen); "Hydrodynamics in Industry. Some Examples with Special Emphasis on Marine Applications" (F. G. Nielsen); "Two Fragments of a Method for Fully Nonlinear Simulations of Water Waves" (X. Cai and E. Mehlum); "Analysis of Non-Linear Wave-Body Interactions Using Finite Elements" (E. Eatock Taylor); "On the Motion of a Rigid Body in Non-Uniform Flows" (A. R. Galper and T. Miloh); "Interaction between Waves and Slowly Rotating Floating Bodies" (J. Grue); "Experiences from Comparing Theory with Environmental and Platform Data" (T. Marthinsen); "Nonlinear Scattering of Long Waves by a Vertical Cylinder" (J. N. Newman); "Mathematical Aspects of the Cauchy-Poisson Problem" (F. Ursell); "Finite Elements for the Boussinesq Wave Equations" (H. P. Langtangen and G. Pedersen); "Continuous Bores on a Viscous Fluid Down an Incline" (J.-J. Lee and C. C. Mei); "Refraction of Solitons and Wave Jumps" (G. Pedersen); "Effect of Film Elasticity on Drift Currents Induced by Growing Waves" (Ø. Sætra and J. E. Weber); "A Resonating Triad of Gravity-Capillary Waves on a Long Gravity Wave" (K. Trulsen and C. C. Mei); "Breaking of Ocean Waves and Downshifting" (M. P. Tulin); "Surface Tension Gradient-Driven Wave Motion in Shallow Liquid Layers" (M. G. Velarde et al.); "Bifurcation of Sequences in Problems of Thermal Convection and of Plane Couette Flow" (F. H. Busse and R. M. Clever); "On the Steady Flow in a Cell Created by a Double-Diffusive Convection Instability" (K. B. Dysthe); "Double-Diffusive Experiments" (A. Foldvik and B. Rudels); "Role of Non-Wave-Like Disturbances in Transition" (M. T. Landahl); "Behaviour of a Nonlinear Convective Oscillator as Modified by Sub- and Super-Critically Unstable Hopf Bifurcations" (P. A. Lundberg); "Waves and Secondary Flows in Stratified Gas/Liquid Duct Flow" (M. Nordsveen and A. F. Bertelsen); "Transient Free Convection in a Horizontal Porous Cylinder with a Sudden Change in Wall Temperature" (H. O. SundfØr and P. A. Tyvand); "Rayleigh-Bénard Convection with Weak Shear Flow: Absolute and Convective Instabilities" (M. Tveitereid and H. W. Müller); "Experiments on Turbulence in Stratified Rotating Flows" (S. B. Dalziel, B. F. Linden, and B. M. Boubnov); "The Flow Generated in a Stratified Fluid by the Motion of a Flat Horizontal Disk" (P. A. Davies et al.); "Models of Drift and Dispersion in Tidal Flows" (B. Gjevik); "Self-Organization Phenomena in 2D-Flows" (G. J. F. van Heijst); "A New Paradigm for River Plume Mixing" (T. A. McClimans); "Wave Attenuation due to Bottom Vegetation" (M. Mork); and "Modelling Mesoscale Features in the Ocean" (L. P. Røed).

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