Journal of Applied Mechanics

Book Reviews

Vortex Flow in Nature and Technology. By Hans J. Lugt. Wiley, New York, 1983. 297 Pages. Price $49.95.

REVIEWED BY H. AREF[1]

As in many other fields of physical science, current modes of analysis in fluid mechanics range from qualitative, heuristic arguments to quantitative, mathematical theories. Linear and nonlinear stability theory and the statistical theory of turbulence, for example, definitely belong to the latter, thoroughly mathematized category. Vortex dominated flows, both laminar and turbulent, on the other hand, frequently (not to say typically) lend themselves to physical arguments sometimes defying current mathematical formalisms. In turn, an explanation of modes or mechanisms within a given flow in terms of vortex dynamic processes is often very gratifying. Such explanations have a noble history in the field of fluid mechanics, although one might criticize the present era for focusing too much on formal procedures and allowing this art of qualitative mechanical reasoning to wither.

The text by Lugt, a comprehensive revision and expansion of a briefer precursor in German, represents a welcome and valuable addition to the literature on qualitative understanding of the mechanics of fluids. The subject is viewed consistently from the perspective of vortex dynamics. The main line of reasoning, divided into 12 chapters, *is* qualitative, essentially devoid of equations, with a brief introduction to quantitative developments relegated to a "Mathematical Supplement" at the end of the book. A quick perusal might thus lead to the opinion that this is just a popular book (in the derogatory sense of the word), but such an assessment is not borne out by closer study. On the contrary, I submit that even seasoned workers in fluid mechanics will find things in Lugt's text that they do not know at all and many that they know in a very different guise. And for the beginning student I recommend that this volume be used as an inspirational supplement to a more traditional textbook.

The text covers an impressively wide array of topics. In Part I we find discussion of the emergence of the vortex concept and the role it has played in the history of science (the author's unique background allows such an in-depth study), kinematics in general, vorticity and vortices (what is a vortex?), flow separation, instabilities, and turbulence. In essence, it is a brief textbook of fluid mechanics written with a particular point of view and in a stimulating, discursive, qualitative style. Part II discusses rotating and stratified fluids with particular emphasis on motion in the atmosphere and oceans. Much of the development in the book is original so far as the arguments are concerned (the results, of course, are generally known by other means) and proceeds aided by a multitude of well-chosen illustrations (many of them from the author's own work). There is considerable emphasis on the results of computer calculations. In fact, p. 47 may contain one of the strongest credos for "numerical experiments" currently in print! There are numerous thought-provoking analogies as well as juxtapositions of natural and technological flow situations which add a special flavor to the book. The discussion is of a uniformly high standard, the layout is pleasing and easy to work with (although I wish that the "Remarks" to each chapter had been worked into the text), the illustrations clear and carefully integrated into the general train of thought, the list of references comprehensive and interesting, and the number of misprints very small indeed (I found less than 10). This is obviously a book by an author who is very well informed on a multitude of topics and, I would guess, to a large extent, is the fruits of a labor of love. It is sure to be of great value to anyone interested in science and in particular to students, teachers, and researchers of applied mechanics.

The book is in a format rather different from common textbooks or traditional treatises with its large pages and many illustrations. It invites comparison with other recent "instant classics" such as Mandelbrot's *Fractals, Form, Chance and Dimension* (Freeman & Co., 1977) or Hofstadter's *Gödel, Escher, Bach* (Vintage Books, 1979). It seems to me likely that Lugt's text will achieve for fluid mechanics in general and vortex dynamics in particular what these books have achieved for their respective disciplines and subjects. And that I find is a most pleasing prospect.

Research Techniques in Nondestructive Testing. Edited by R. S. Sharpe. Academic Press, New York, 1982. 332 Pages. Price $58.50.

REVIEWED BY J. D. ACHENBACH[2]

Quantitative nondestructive evaluation (QNDE) has enjoyed a surge of interest in recent years. QNDE methods based on the propagation of mechanical and/or thermal disturbances fall within the areas of research activity of many workers in applied mechanics. Volume V in the series on

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Recommend Documents. Research techniques in nondestructive testingâ€”Volume 2. Research techniques in nondestructive testing, volume 3. Present state of magnetic nondestructive testing techniques. Application of nondestructive testing techniques to materials testing. Study of beamforming techniques for ultrasound imaging in nondestructive testing. Nondestructive Testing. Nondestructive Testing in Urologic Oncology. New procedures in nondestructive testing. Mechanics of nondestructive testing. NONDESTRUCTIVE TESTING | Sonic.Â In the section on ultrasonic testing t h e r e is for the f i r s t time a c l e a r verdict on the health hazard in ultrasonic testing which the author d e c l a r e s is p e r fectly h a r m l e s s to human beings. Destructive Testing is a software assessment technique used to find points of failure in a software program. In this tutorial, you will learn- What is Destructive Testing Why to do Destructive Testing.Â Techniques, Methods, Example. Details. Last Updated: 18 September 2019. What is Destructive Testing? Destructive Testing is defined as a software testing type to find points of failure in a software program. It is a testing method where an application is intentionally made to fail to check the robustness of the application and identify the point of failure. Unlike other testing method which checks the function of an application, this technique will check the unpredictable user behavior within the application. Near field focusing for nondestructive microwave testing at 24 GHz â€“ Theory and experimental verification - Open access. Christian Ziehm | Sebastian Hantscher | View All Recent Articles. Micro-CT image calibration to improve fracture aperture measurement - Open access. Hamed Lamei Ramandi | Ryan T. Armstrong | ...Â The most downloaded articles from Case Studies in Nondestructive Testing and Evaluation in the last 90 days. Comparison of different additive manufacturing methods using computed tomography - Open access. Paras Shah | Radu Racasan | Comparison of medical and industrial X-ray computed tomography for non-destructive testing - Open access. Anton du Plessis | Stephan Gerhard le Roux |