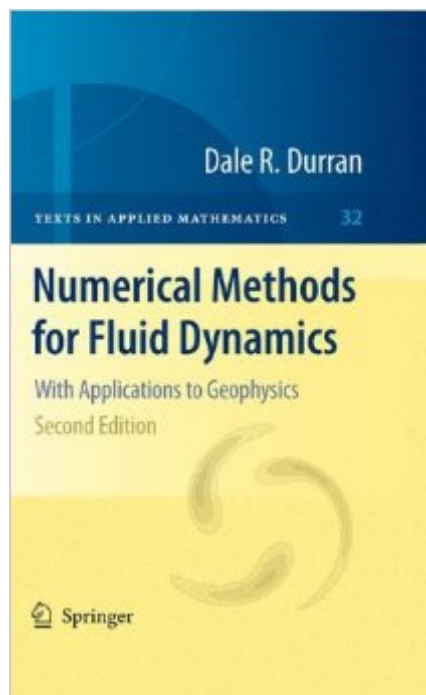# Numerical Methods For Fluid Dynamics: With Applications To Geophysics (Texts In Applied Mathematics)

Synopsis

This scholarly text provides an introduction to the numerical methods used to model partial differential equations, with focus on atmospheric and oceanic flows. The book covers both the essentials of building a numerical model and the more sophisticated techniques that are now available. Finite difference methods, spectral methods, finite element method, flux-corrected methods and TVC schemes are all discussed. Throughout, the author keeps to a middle ground between the theorem-proof formalism of a mathematical text and the highly empirical approach found in some engineering publications. The book establishes a concrete link between theory and practice using an extensive range of test problems to illustrate the theoretically derived properties of various methods. From the reviews: "...the books unquestionable advantage is the clarity and simplicity in presenting virtually all basic ideas and methods of numerical analysis currently actively used in geophysical fluid dynamics." Physics of Atmosphere and Ocean

Book Information

Series: Texts in Applied Mathematics (Book 32)

Hardcover: 516 pages

Publisher: Springer; 2nd ed. 2010 edition (September 23, 2010)

Language: English

ISBN-10: 1441964118

ISBN-13: 978-1441964113

Product Dimensions: 6.1 x 1.1 x 9.2 inches

Shipping Weight: 2 pounds (View shipping rates and policies)

Average Customer Review: 5.0 out of 5 stars See all reviews (1 customer review)

Best Sellers Rank: #978,387 in Books (See Top 100 in Books)   #125 in Books > Science & Math > Mathematics > Number Systems   #208 in Books > Science & Math > Earth Sciences > Geophysics   #836 in Books > Textbooks > Engineering > Civil Engineering

Customer Reviews

An excellent text. One of the clearer discussions within geophysical flows of the numerical techniques for problem solving. The material on semi-implicit timestepping was particularly useful. Previously, I've only found this in Canuto et al 2006 (Spectral Methods, Volumes 1 & 2), and this text by Durran is significantly more approachable.

Numerical Methods for Fluid Dynamics: With Applications to Geophysics (Texts in Applied Mathematics) Riemann Solvers and Numerical Methods for Fluid Dynamics: A Practical Introduction Numerical Partial Differential Equations: Finite Difference Methods (Texts in Applied Mathematics) Introduction to Numerical Analysis (Texts in Applied Mathematics) Stochastic Models, Information Theory, and Lie Groups, Volume 2: Analytic Methods and Modern Applications (Applied and Numerical Harmonic Analysis) Geotechnical and Environmental Geophysics (Investigations in Geophysics) Numerical Analysis for Engineers: Methods and Applications, Second Edition (Textbooks in Mathematics) Numerical Techniques for Direct and Large-Eddy Simulations (Chapman & Hall/CRC Numerical Analysis and Scientific Computing Series) Numerical Methods for Scientists and Engineers (Dover Books on Mathematics) Fibonacci and Lucas Numbers with Applications, Volume One (Pure and Applied Mathematics: A Wiley Series of Texts, Monographs and Tracts) Middle Atmosphere Dynamics, Volume 40 (International Geophysics) Direct Methods for Solving the Boltzmann Equation and Study of Nonequilibrium Flows (Fluid Mechanics and Its Applications) Introduction to Applied Geophysics: Exploring the Shallow Subsurface Books of Breathing and Related Texts -Late Egyptian Religious Texts in the British Museum Vol.1 (Catalogue of the Books of the Dead and Other Religious Texts in the British Museum) Fluid Flow in the Subsurface: History, Generalization and Applications of Physical Laws (Theory and Applications of Transport in Porous Media) Selected Unsolved Problems in Coding Theory (Applied and Numerical Harmonic Analysis) Geophysical Well Logging, Volume 24: Excerpted From Methods in Experimental Physics, Geophysics Electromagnetic Soundings (Methods in Geochemistry and Geophysics) Statistical Methods in the Atmospheric Sciences, Volume 100, Third Edition (International Geophysics) Essentials of Computational Fluid Dynamics