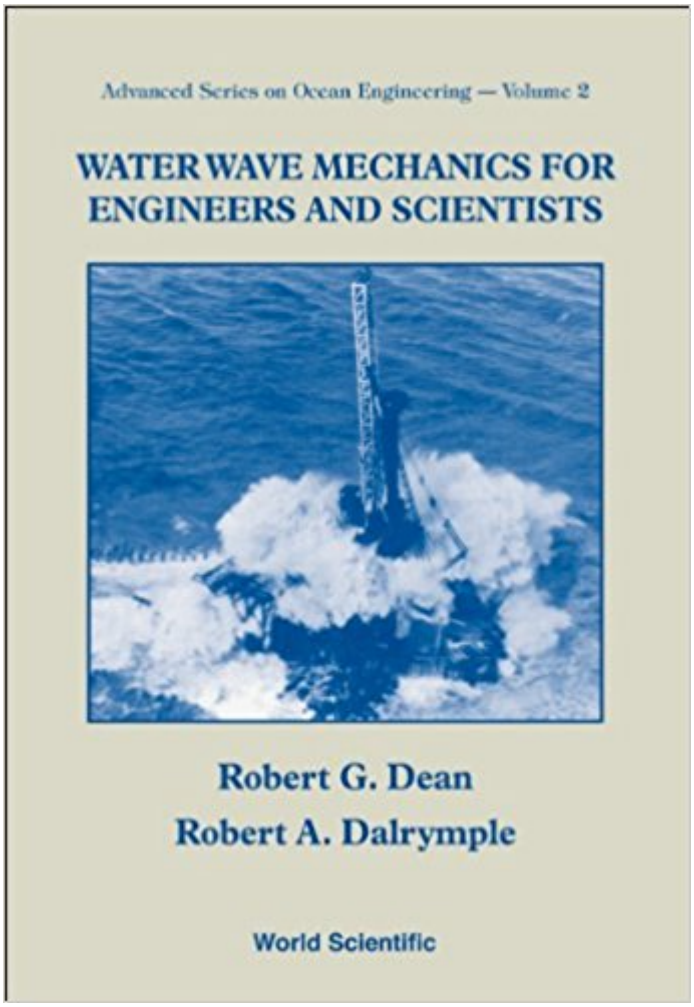
Water Wave Mechanics For Engineers And Scientists: 2 (Advanced Series On Ocean Engineering)



Synopsis

This book is intended as an introduction to classical water wave theory for the college senior or first year graduate student. The material is self-contained; almost all mathematical and engineering concepts are presented or derived in the text, thus making the book accessible to practicing engineers as well.The book commences with a review of fluid mechanics and basic vector concepts. The formulation and solution of the governing boundary value problem for small amplitude waves are developed and the kinematic and pressure fields for short and long waves are explored. The transformation of waves due to variations in depth and their interactions with structures are derived. Wavemaker theories and the statistics of ocean waves are reviewed. The application of the water particle motions and pressure fields are applied to the calculation of wave forces on small and large objects. Extension of the linear theory results to several nonlinear wave properties is presented. Each chapter concludes with a set of homework problems exercising and sometimes extending the material presented in the chapter. An appendix provides a description of nine experiments which can be performed, with little additional equipment, in most wave tank facilities.Contents:Introduction to Wave MechanicsA Review of Hydrodynamics and Vector AnalysisSmall-Amplitude Water Wave Theory Formulation and SolutionEngineering Wave PropertiesLong WavesWavemaker TheoryWave Statistics and SpectraWave ForcesWaves Over Real SeabedsNonlinear Properties Derivable from Small-Amplitude WavesNonlinear WavesA Series of Experiments for a Laboratory Course Component in Water WavesReadership: Coastal and ocean engineers.

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Customer Reviews

The objectives of this book are to introduce the reader to the fundamental understanding of water wave theory and to apply the basic physical principles to the coastal and ocean environments. The prerequisites for understanding this book are knowledge of fluid mechanics, basic calculus, and differential equations. Thus it is presumed that the student is an engineer, and probably an ocean engineer. This book is really quite accessible. I am an electrical engineer and I have been using it to help perform animations and visual effects regarding water and its properties. Its clear examples have been quite valuable in turning seemingly complex equations into actual physical phenomena that can be measured. I consider it a steal at its low price considering its content. Also, it is good as a textbook since it contains plenty of homework problems at the end of each chapter.The table of contents are:Introduction to Wave MechanicsA Review of Hydrodynamics and Vector Analysis (Eulerian and Lagrangian view, Navier-Stokes Equation)Small-Amplitude Water Wave Theory Formulation and SolutionEngineering Wave PropertiesLong WavesWavemaker TheoryWave Statistics and SpectraWave ForcesWaves Over Real SeabedsNonlinear Properties Derivable from Small-Amplitude WavesNonlinear WavesA Series of Experiments for a Laboratory Course Component in Water Waves

When I was in college studying structural engineering, one of my professors told the class: "The trouble with you students is, you don’t know what you don’t know". This book is a perfect illustration that, I "didn’t know what I didn’t know" much about water waves. This subject is very interesting.I got into this subject because I was designing an ocean marine dock. This book serves as an excellent resource for learning the essential topics, theory and technical jargon of this interesting field. Be forewarned that you will need a good understanding of differential equations to understand this subject.Written by two experts in this field, Professors Dean and Dalrymple cover the fundamental physics and mathematics of water wave mechanics. The mathematical derivation of formulas is impressive. The authors have gone through extra effort to explain things clearly. The focus is on

classical solutions, with little in the way of numerical solutions.An especially nice feature are the historical tributes to great mathematicians, scientists and engineers of the past who made significant contributions in this field.

An absolute must for ocean engineers, specifically when dealing with waves and coastal structures. I am constantly going back to this book to use a reference for formulas and information.

I enjoy fluid mechanics texts. I also enjoy the ocean. Hence, I enjoy this book.It begins with an excellent review of the Navier-Stokes equations, then leads into potential flow and streamfunctions. It’s not a completely thorough derivation, but it doesn’t gloss over any concepts or use any handwavy tricks.The application problems and development of waves and wave theory are great.Highly recommended.(P.S. My MS and PhD are in Fluid Mechanics, but I teach math. This is kind of where I’m coming from.)

This book is a good reference but it is written for like a post doctoral researcher. There is no way a practicing engineer could comprehend this without having some prior experience. Terrible for a text book.

Must for every Naval Architect or Ocean Engineer working with waves. References at the end of every chapter are very helpful for someone who wants to dig deep into a particular topic. Great work indeed!!

Great value for the price but a few of the equations are very small and difficult to read in the Kindle version.

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