



# Theory and Applications of Ocean Surface Waves: Part 1: Linear Aspects

## Part 2: Nonlinear Aspects: 23 (Advanced Series on Ocean Engineering)

*C Mei Chiang, Michael Stiassnie, Dick K-P Yue*

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# **Theory and Applications of Ocean Surface Waves:Part 1: Linear AspectsPart 2: Nonlinear Aspects: 23 (Advanced Series on Ocean Engineering)**

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This book is an expanded version of *The Applied Dynamics of Ocean Surface Waves*. It presents theoretical topics on ocean wave dynamics, including basic principles and applications in coastal and offshore engineering as well as coastal oceanography. Advanced analytical and numerical techniques are applied, such as singular perturbations. In this expanded version, three chapters on recent developments have been added. The first is on multiple scattering by periodic or random bathymetry. The second is on Zakharov's theory of nonlinear wave fields with broad spectra. The third is an extensive discussion of powerful numerical techniques for highly nonlinear waves. Other new topics include infragravity waves, upstream solitons, Venice storm gates, etc. In addition, there are many new exercises.

*Theory and Applications of Ocean Surface Waves* will be invaluable for graduate students and researchers in coastal and ocean engineering, geophysical fluid dynamicists interested in water waves, and theoretical scientists and applied mathematicians wishing to develop new techniques for challenging problems or to apply techniques existing elsewhere.

## **Sample Chapter(s)**

Chapter 1: Introduction

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## **Contents:**

### **• Part 1:**

- Propagation of Transient Waves in Open Water of Essentially Constant Depth
- Refraction by Slowly Varying Depth or Current
- Long Waves of Infinitesimal Amplitude Over Bottom with Appreciable Variations
- Harbor Oscillations Excited by Incident Long Waves
- Effects of Head Loss at a Constriction on the Scattering of Long Waves: Hydraulic Theory
- Multiple Scattering by Seabed Irregularities
- Floating Body Dynamics: Diffraction and Radiation by Large Bodies
- Viscous Damping in Small-Amplitude Waves

### **• Part 2:**

- Mass Transport Due to Viscosity
- Radiation Stresses, Bound Long Waves and Longshore Current
- Nonlinear Long Waves in Shallow Water
- Narrow-Banded Nonlinear Waves in Water of Intermediate or Great Depth
- Broad-Banded Nonlinear Surface Waves in the Open Sea
- Numerical Simulation of Nonlinear Wave Dynamics

**Readership:** Graduate students and lecturers in coastal and ocean engineering, as well as theoretical engineers, applied mathematicians and geophysicists.

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