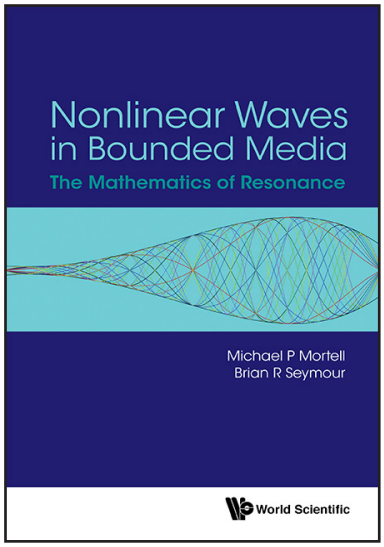
NONLINEAR WAVES IN BOUNDED MEDIA

The Mathematics of Resonance

By **Michael P Mortell** (*University College Cork, Ireland*) & **Brian R Seymour** (*University of British Columbia, Canada*)



Key Features:

- The only book dealing with nonlinear waves in bounded media
- Highlights the introduction and analysis of solutions of a nonlinear difference equation — the standard mapping — that connects shocked resonance to chaos
- Introduces many concepts and publishes extensively in the literature of nonlinear waves and nonlinear resonance

Description:

This unique book aims to treat a class of nonlinear waves that are reflected from the boundaries of media of finite extent. It involves both standing (unforced) waves and resonant oscillations due to external periodic forcing. The waves are both hyperbolic and dispersive. To achieve this aim, the book develops the necessary understanding of linear waves and the mathematical techniques of nonlinear waves before dealing with nonlinear waves in bounded media. The examples used come mainly from gas dynamics, water waves and viscoelastic waves.

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Binding: Hardcover

ISBN: 978-981-3100-33-6

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Page Extent: 320pp

Type: Monograph (Treat as Textbook)

Main Subject: Acoustics; Fluid Mechanics; Difference And Functional Equations; Complex Systems; Classical Mechanics, Continuum Physics, Acoustics

BIC: TTA

BISAC: TEC001000; SCI085000; SCI003000

Keywords: Nonlinear Waves; Resonance; Sloshing; Chaos; Solitons; KdV Equation

Imprint: World Scientific Publishing Company

Readership: Advanced undergraduate and graduate students, researchers and practitioners in the field of acoustics, fluid mechanics and applied physics.

Contents:

- Physical Examples: Basic Equations
- Classical Linear Solutions
- Dimensionless Variables
- Spherical and Cylindrical Waves
- Linear Waves in Stratified Media
- Linear Geometric Acoustics
- Webster Horn Equation, Exact Solutions
- Kinematic and Simple Waves
- Nonlinear Geometric Acoustics
- Non-Interacting Simple Waves
- Standing Waves and Sloshing in a Tank
- Nonlinear Resonance in a Closed Tube: Shocked Solutions
- A Bouncing Ball and Chaos
- Nonlinearization
- Subharmonic Resonance
- Finite Rate Oscillations, Invariant Curves
- Evolution of Resonant Oscillations
- Shaped and Stratified Resonators
- Resonant Sloshing in a Shallow Tank
- Nonlinear Resonance in an Open Tube

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