

1. Record Nr.	UNINA9910139599903321
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Titolo	Water waves : the mathematical theory with applications / / J.J. Stoker
Pubbl/distr/stampa	New York, : Wiley, 1992
ISBN	9786613246509 9781283246507 1283246503 9781118033159 1118033159 9781118031353 1118031350
Descrizione fisica	1 online resource (598 p.)
Collana	Wiley classics library
Disciplina	532/.593
Soggetti	Water waves Hydrodynamics Hydraulics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Originally published: New York : Interscience, 1958. "A Wiley-Interscience publication."
Nota di bibliografia	Includes bibliographical references (p. 545-560) and indexes.
Nota di contenuto	Water Waves: The Mathematical Theory with Applications; Introduction; Acknowledgments; Contents; PART I; 1. Basic Hydrodynamics; 1.1 The laws of conservation of momentum and mass; 1.2 Helmholtz's theorem; 1.3 Potential flow and Bernoulli's law; 1.4 Boundary conditions; 1.5 Singularities of the velocity potential; 1.6 Notions concerning energy and energy flux; 1.7 Formulation of a surface wave problem; 2. The Two Basic Approximate Theories; 2.1 Theory of waves of small amplitude; 2.2 Shallow water theory to lowest order. Tidal theory; 2.3 Gas dynamics analogy 2.4 Systematic derivation of the shallow water theoryPART II; Subdivision A Waves Simple Harmonic in the Time; 3. Simple Harmonic Oscillations in Water of Constant Depth; 3.1 Standing waves; 3.2 Simple harmonic progressing waves; 3.3 Energy transmission for simple harmonic waves of small amplitude; 3.4 Group velocity. Dispersion; 4.

Waves Maintained by Simple Harmonic Surface Pressure in Water of Uniform Depth. Forced Oscillations; 4.1 Introduction; 4.2 The surface pressure is periodic for all values of x ; 4.3 The variable surface pressure is confined to a segment of the surface 4.4 Periodic progressing waves against a vertical cliff 5. Waves on Sloping Beaches and Past Obstacles; 5.1 Introduction and summary; 5.2 Two-dimensional waves over beaches sloping at angles $=\pi/2n$; 5.3 Three-dimensional waves against a vertical cliff; 5.4 Waves on sloping beaches. General case; 5.5 Diffraction of waves around a vertical wedge. Sommerfeld's diffraction problem; 5.6 Brief discussions of additional applications and of other methods of solution; Subdivision B Motions Starting from Rest. Transients; 6. Unsteady Motions; 6.1 General formulation of the problem of unsteady motions 6.2 Uniqueness of the unsteady motions in bounded domains 6.3 Outline of the Fourier transform technique; 6.4 Motions due to disturbances originating at the surface; 6.5 Application of Kelvin's method of stationary phase; 6.6 Discussion of the motion of the free surface due to disturbances initiated when the water is at rest; 6.7 Waves due to a periodic impulse applied to the water when initially at rest. Derivation of the radiation condition for purely periodic waves; 6.8 Justification of the method of stationary phase 6.9 A time-dependent Green's function. Uniqueness of unsteady motions in unbounded domains when obstacles are present Subdivision C Waves on a Running Stream. Ship Waves; 7. Two-dimensional Waves on a Running Stream in Water of Uniform Depth; 7.1 Steady motions in water of infinite depth with $p = 0$ on the free surface; 7.2 Steady motions in water of infinite depth with a disturbing pressure on the free surface; 7.3 Steady waves in water of constant finite depth; 7.4 Unsteady waves created by a disturbance on the surface of a running stream 8. Waves Caused by a Moving Pressure Point. Kelvin's Theory of the Wave Pattern created by a Moving Ship

Sommario/riassunto

Offers an integrated account of the mathematical hypothesis of wave motion in liquids with a free surface, subjected to gravitational and other forces. Uses both potential and linear wave equation theories, together with applications such as the Laplace and Fourier transform methods, conformal mapping and complex variable techniques in general or integral equations, methods employing a Green's function. Coverage includes fundamental hydrodynamics, waves on sloping beaches, problems involving waves in shallow water, the motion of ships and much more.

2. Record Nr.	UNINA9910895446303321
Titolo	Folk & musik : det danske magasin for folkrootsmusik
Pubbl/distr/stampa	°Arhus, 2000-2007
ISSN	1902-8547
Descrizione fisica	Online-Ressource
Classificazione	9,2
Disciplina	780 390
Soggetti	Zeitschrift
Lingua di pubblicazione	Danese
Formato	Materiale a stampa
Livello bibliografico	Periodico