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Submerged Obstacles -- Waves in the Presence of Surface-Piercing Structures -- Vertical Cylinders in Channels -- Ship Waves on Calm Water -- Green's Functions -- Three-Dimensional Problem of a Point Source in Deep Water -- Far-Field Behavior of the Three-Dimensional Green's Function -- Two-Dimensional Problems of Line Sources -- The Neumann-Kelvin Problem for a Submerged Body -- Cylinder in Deep Water -- Cylinder in Shallow Water -- Wave Resistance -- Three-Dimensional Body in Deep Water -- Two-Dimensional Problem for a Surface-Piercing Body -- General Linear Supplementary Conditions at the Bow and Stern Points -- Total Resistance to the Forward Motion -- Other Supplementary Conditions.

Sommario/riassunto

This book gives a self-contained and up-to-date account of mathematical results in the linear theory of water waves. The study of waves has many applications, including the prediction of behavior of floating bodies (ships, submarines, tension-leg platforms etc.), the calculation of wave-making resistance in naval architecture, and the description of wave patterns over bottom topography in geophysical hydrodynamics. The first section deals with time-harmonic waves. Three linear boundary value problems serve as the approximate mathematical models for these types of water waves. The next section, in turn, uses a plethora of mathematical techniques in the investigation of these three problems. Among the techniques used in the book the reader will find integral equations based on Green's functions, various inequalities between the kinetic and potential energy, and integral identities which are indispensable for proving the uniqueness theorems. For constructing examples of non-uniqueness usually referred to as 'trapped modes' the so-called inverse procedure is applied. Linear Water Waves will serve as an ideal reference for those working in fluid mechanics, applied mathematics, and engineering.