Kuznetsov, N.; **Maz'ya, V.**; **Vainberg, B.**
Linear water waves. A mathematical approach. (English) Zbl 0996.76001
Cambridge: Cambridge University Press. xvi, 512 p. (2002).

This book contains a detailed, self-contained and up-to-date development of the linear mathematical theory of water waves. The book is divided into three sections covering linear boundary value problems providing approximate representations of, respectively, time-harmonic waves, ship waves on calm water, and unsteady waves. The introductory chapter provides the necessary physical background for each of these three groups of problems including, for example, a linearization applied to nonlinear boundary conditions on the water surface. Throughout the book many different mathematical approaches are developed and then applied. The techniques for establishing existence and uniqueness conditions are developed in detail, together with asymptotic methods for use at infinity and near boundary singularities. Trapped modes are considered as examples of nonuniqueness of solutions, and their construction involves the use of inverse procedures.

This book, written by three authors who together have made many fundamental contributions to the understanding of linear water waves, provides a sound reference volume for all researchers in this fascinating field, and also for workers in linear partial differential equations for whom it will serve as a valuable source of new problems and techniques. The style of writing is clear throughout, and the extensive bibliography comprising 370 entries is one of the most extensive and useful I have seen. This book can be recommended to all whose work involves the study of linear water waves.

Reviewer: A.Jeffrey (Newcastle upon Tyne)

MSC:

76-02	Research exposition (monographs, survey articles) pertaining to fluid mechanics	Cited in **3** Reviews Cited in **59** Documents
76B15	Water waves, gravity waves; dispersion and scattering, nonlinear interaction	
76B20	Ship waves	

Keywords:

linear theory of water waves; linear boundary value problems; time-harmonic waves; ship waves; unsteady waves; linearization; nonlinear boundary conditions; existence; uniqueness; asymptotic methods; inverse procedures

Full Text: DOI