<<海岸水域表面波动力学>>

图书基本信息

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前言

Wave motion surrounds us——from the most secret, profound waves of quantummechanics to the grand waves of the ocean surface. Ocean waves, or water waves, may be divided into deep- and shallow- water（coastal） waves. From an advance point of view, coastal waves are not studied asthoroughly as deep-water waves due to a complicated seabed topography on theformer but not on the latter. Therefore, in conjunction with the effects of ubiqui-tous ambient currents, wave-current-bottom interactions make up the most fun-damental, widespread dynamical mechanism in coastal waters manifesting itselfas refraction, diffraction, scattering, and resonant wave interactions involved inenergy exchanges.Apparently, it is essential to obtain a full, clear explanation and descriptionof coastal waves for the development of broad offshore, coastal and harbor en-gineering, and also for having a better understanding of the evolutionary mech-anism of deep-water waves. In fact, a commanding view on long-term inves-tigating water waves is to wholly and uniformly treat and describe deep- andshallow-water waves, thus promoting the present rapid exploration and devel-opment of global oil and gas fields in deep waters of the oceans.The aforementioned views, ideas, judgments, all that I have thought and doneover the last ten years, were compiled by me in this book. The book consists ofnine chapters and appendices from A to H, depicting the fundamental paradigmsof weakly nonlinear water waves.

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内容概要

Dynamics of Surface Waves in Coastal Waters Wave-Current-Bottom Interactions develops the typical basic theories (e,g. mild-slope equation and shorecrested waves) and applications of water wave propagation with an emphasis on wave-current-bottom interactions and Hamiltonian systems. In recent times, the interest in water wave propagation has accelerated because of rapid developments in global coastal ocean engineering.

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书籍目录

章节摘录

插图：The third term can be called the bottom wave action, a positive compensation byincluding the effects of moving bottoms and describing a widespread dynamicprocess occurring on the nearshore bottoms （such as coastal evolution and sand-wave migrations）. The fourth term may be considered as the dissipation waveaction, transmitting a full scale effect of the dissipation arising from the originin the viscosity of fluid, determining its nonnegligible dissipative function of thecomplete equation system, and probably having a widespread value of applica-tion. Finally the fifth term vanishes identically [2]. Therefore it can be seen thatthese four kinds of wave actions on the left of equation （7.4.2） reach mutuallya more general form of integration with complement, compatibility and distinc-tion. Bretherton and Garrett [2] had shown the equivalence of equation （7.4.1）for many other types of wave motion in fluid dynamics, so that, （7.4.2） can beregarded as a valuable extension of （7.4.1）, giving rise to a generalized waveaction equation for the dissipative dynamical system in the nearshore region,which will play an important role in dealing with the process of real viscousflow.

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编辑推荐

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