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Sommario/riassunto

A systematic study of chaotic ray dynamics in underwater acoustics began in the mid-1990s when it was realized that this factor plays a crucial role in long-range sound propagation in the ocean. The phenomenon of ray chaos and its manifestation at a finite wavelength -- wave chaos -- have been investigated by combining methods from the theory of wave propagation and the theory of dynamical and quantum chaos. This is the first monograph summarizing results obtained in this field. Emphasis is made on the exploration of ray and modal structures of the wave field in an idealized environmental model with periodic range dependence and in a more realistic model with sound speed fluctuations induced by random internal waves. The book is intended for acousticians investigating the long-range sound transmission through the fluctuating ocean and also for researchers studying waveguide propagation in other media. It will be of major interest to scientists working in the field of dynamical and quantum chaos.