Principles of Marine Bioacoustics
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Principles of Marine Bioacoustics provides a comprehensive overview of the bioacoustics of marine life. It is targeted for bioacousticians, and is intended to focus on areas of knowledge that they should master. These areas encompass mathematical concepts of acoustics, including the wave equation and acoustic wave propagation in an oceanic medium. They also include an understanding of how transducers operate, how sounds are detected by hydrophones, and how digital signals can be transformed into analog signals that drive a sound projector. An understanding of the hearing and sound production mechanisms for marine animals is also important. This book achieves its objective of providing that knowledge base. It also is a valuable information source for engineers and scientists with a background in acoustics, and who are interested in gaining insights into the bioacoustics of marine life. The book is divided into two parts.

Part I provides a comprehensive overview of classical acoustics in eight chapters. A wide span of topics is reviewed including fundamentals of acoustics, acoustic propagation principles, transducer properties and principles, and signal recording and data analysis. The auditory systems of marine animals are also introduced and contrasted with the auditory system of human beings.

Part II discusses the acoustics of marine animals in five chapters. Hearing in marine animals is presented with a focus on hearing sensitivity to various types of signals (e.g., continuous tones, pulse tones, chirps), spectral analysis of the signals (e.g., critical bandwidth and frequency discrimination), and sound localization. The emission of social sounds generated by classes of marine animals is introduced, with a description of their spectral characteristics. Frequency bandwidths of the sounds, their characteristics (e.g., whistles, clicks and pulses), and their amplitudes are discussed. Echolocation by Marine Mammals, including the use of echolocation by dolphins and whales to detect and discriminate targets, is discussed. Signal processing techniques and instrumentation applicable to marine bioacoustics is also summarized.

This book is a value information source on marine biocoustics and is recommended.

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