Marine acoustics: direct and inverse problems

Buchanan, James L., author

Abstrak

This book presents current research trends in the field of underwater acoustic wave direct and inverse problems. Until very recently, little has been published concerning model-based inversions of the boundaries and material constants of finite-sized targets located either in the water column or the sediments. This text is the first to investigate inverse problems in an ocean environment with a heavy emphasis placed on the description and resolution of the forward scattering problem.

Marine Acoustics: Direct and Inverse Problems emphasizes computation of Green's Functions with new material added for elastic and poro-elastic seabeds. This timely publication addresses many areas of practical interest in connection with underwater acoustical imaging including ecological survey and clean up, protection of open water harbors, offshore petroleum and gas enterprises, as well as environmental and military uses.

The ocean-seabed system is an acoustic waveguide and this is the only book that treats inverse problems in a waveguide. The propagation of acoustic waves in this system is treated for various types of seabeds and the direct and inverse problems are considered in realistic ocean environments. The inverse problem is to determine the shape of an impenetrable or penetrable object, or to determine the coefficients describing the seabed. This is done by acoustically illuminating the seabed and investigating the scattered field.