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Sound Propagation; Introduction; 4.1. Ground effect in a homogeneous atmosphere; 4.2. Diffraction by an obstacle in homogeneous atmosphere; 4.3. Sound propagation in an inhomogeneous medium; Bibliography; Chapter 5. Analytic Expansions and Approximation Methods; Introduction; 5.1. Asymptotic expansions obtained from integral expressions; 5.2. Kirchhoff approximation; 5.3. Neumann series; 5.4. W.K.B. method. Born and Rytov approximations
5.5. Image method, ray method, geometrical theory of diffraction5.6. Parabolic approximation; 5.7. Wiener-Hopf method; Bibliography; Chapter 6. Boundary Integral Equation Methods - Numerical Techniques; Introduction; 6.1. Techniques of solution of integral equations; 6.2. Eigenvalue problems; 6.3. Singularities; Bibliography; Chapter 7. Introduction to Guided Waves; Introduction; 7.1. Definitions and general remarks; 7.2. The problem of the waveguide; 7.3. Radiation of sources in ducts with ' sharp ' interfaces; 7.4. Shallow water guide; 7.5. Duct with absorbing walls
7.6. Ducts with varying cross section7.7. Conclusion; Bibliography; Chapter 8. Transmission and Radiation of Sound by Thin Plates; Introduction; 8.1. A simple one-dimensional example; 8.2. Equation governing the normal displacement of a thin elastic plate; 8.3. Infinite fluid-loaded thin plate; 8.4. Finite-dimension baffled plate: expansions of the solution into a series of eigenmodes and resonance modes; 8.5. Finite-dimension baffled plate: boundary integrals representation of the solution and boundary integral equations; 8.6. Conclusion; Bibliography; Chapter 9. Problems
Mathematical Appendix: Notations and Definitions

Sommario/riassunto

The book is devoted to the very basis of acoustics and vibro-acoustics. The physics of the phenomena, the analytical methods and the modern numerical techniques are presented in a concise form. Many examples illustrate the fundamental problems and predictions (analytic or numerical) and are often compared to experiments. Some emphasis is put on the mathematical tools required by rigorous theory and reliable prediction methods.Key Features* a series of practical problems, which reflect the content of each chapter* reference to the major treatises and fundamental recent papers<br