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| Soggetti | Building materials<br>Acoustical engineering<br>Metamaterials<br>Underwater acoustics<br>Sound<br>Structural Materials<br>Engineering Acoustics<br>Acoustics |
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| Nota di bibliografia | Includes bibliographical references and index. |
| Nota di contenuto | Intro -- Preface -- Contents -- 1 Introduction and State of the Art -- References -- 2 Wave Propagation in Periodic Media -- 2.1 Acoustic Waves in Fluids -- 2.2 Elastic Waves in Homogeneous, Isotropic Solids -- 2.3 Elastic Waves in Homogenous, Anisotropic Media -- 2.4 Wave Propagation in Sonic Crystals -- 2.5 Wave Propagation in Phononic Crystals -- 2.6 Long-Wavelength Homogenization -- 2.7 Further Readings -- References -- 3 Transformation Acoustics -- 3.1 Inertial Cloaking -- 3.2 Pentamode Materials and Pentamode Cloaking -- References -- 4 Transformation Acoustics in Elliptic Coordinates -- 4.1 Defining Transformations in Elliptic Coordinates -- 4.2 Selected Examples of Transformations in Elliptic Coordinates -- 4.2.1 Spatially Independent Elasticity Tensor -- 4.2.2 Bulk Moduli Following a Power Law -- 4.2.3 Spatially Independent Density -- 4.3 Numerical Test Cases -- References -- 5 Design and Experimental Validation of an Elliptic Cloak -- 5.1 Problem Setting -- 5.2 Microstructure Design and |

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| | Validation -- 5.3 Experimental Setup -- 5.4 Results and Discussion -- References. |
| Sommario/riassunto | The book investigates acoustic cloaking for elliptical targets, starting from the development of a systematic approach to deal with such non-axisymmetrical shapes by adopting transformation acoustics in elliptic coordinates, and concluding with numerical and experimental validation of a microstructured cloak in the underwater environment. The book thus comprises all the steps from theory to practice that led to the first experimental validation of acoustic invisibility for non-cylindrical objects, whose results are presented in the last chapter. Indeed, despite Transformation Theory is now an established tool to design material distributions capable to unlock the design of invisibility devices, it is not trivial to apply it for shapes different than the sphere and the cylinder, which are thus the ones mainly addressed in the literature. This book paves the way for exploration of other shapes, demonstrating the effectiveness of a pentamode cloak in reducing the acoustic visibility of an elliptical target, and discussing design choices that can make the implementation of the required microstructure less cumbersome despite the lack of axial symmetry of the problem, from both the numerical and manufacturing point of views. |