



# Elastic Waves in Anisotropic Laminates

*G.R. Liu, Z. C. Xi*

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Ultrasonic non-destructive evaluation (NDE) plays an increasingly important role in determining properties and detecting defects in composite materials, and the analysis of wave behavior is crucial to effectively using NDE techniques. The complexity of elastic wave propagation in anisotropic media has led to a reliance on numerical methods of analysis-methods that are often quite time-consuming and whose results yield even further difficulties in extracting explicit phenomena and characteristics.

Innovative and insightful, *Elastic Waves in Anisotropic Laminates* establishes a set of high-performance, analytical-numerical methods for elastic wave analysis of anisotropic layered structures. The treatment furnishes a comprehensive introduction, sound theoretical development, and applications to smart materials, plates, and shells. The techniques, detailed in both the time and frequency domains, include methods that combine the finite element method (FEM) with the Fourier transform approach and the strip element method (SEM). These -methods can also be used for expediently finding the Green's function for anisotropic laminates useful for inverse problems related to wave propagation, and methods for inverse analyses, including conjugate gradient methods, and genetic algorithms are also introduced.

The text is complemented by many examples generated using software codes based on the techniques developed. Filled with charts and illustrations, *Elastic Waves in Anisotropic Laminates* is accessible even to readers from non-engineering backgrounds and offers a unique opportunity to discover methods that can lead to an understanding of the dynamic characteristics and wave motion behaviors of advanced composite materials.

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