

Analysis of wave propagation and transient response in laminated piezoelectric cylindrical shells

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Abstract

The method of reverberation-ray matrix (MRRM) has been successfully utilized to study the transient wave in beams, plates and laminated solids. In this work, the MRRM is adopted to study the transient responses of piezoelectric cylindrical shells with finite size under impact load. Based on the Donnell shell theory, the reverberation matrix formulation in the cylindrical shell is derived. Using Laplace transformation, the transient responses under imposed impact load can be predicted. Through the numerical simulations, the early short time transient responses can be further elucidated. An analysis for the wave propagation case of composite piezoelectric plates completes the paper.

Keywords: Laminated piezoelectric cylindrical shell, Donnell shell theory, the method of reverberation-ray matrix, transient response, wave propagation

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