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Modal vibration analysis of thick visco-elastic annular cylinders

Modal vibration analysis for thick visco-elastic annular cylinders of infinite extent is considered. The cylinder is excited by boundary stresses at the inner and outer surfaces. The governing equation of motion is developed by utilizing the three-dimensional theory of elastodynamics. Material damping is allowed using complex elastic moduli for the viscoelastic medium. Modal displacements and stresses at any point in the medium are formulated in terms of boundary stresses. Frequency responses for radial, tangential and axial displacements are computed for different circumferential and axial wave numbers. The effect of different material loss factors on the frequency responses is examined for axial and non-axisymmetric modes. The dimensionless resonant frequencies for elastic medium (no material damping) are compared with dimensionless natural frequencies available for elastic material. The comparison indicates excellent agreement between these results.

Biography

Hamid R Hamidzadeh received his PhD in applied mechanics from Imperial College where he also conducted postdoctoral research for four years. He is the Professor of Mechanical and Manufacturing Engineering Department at Tennessee State University. He is a fellow of the ASME and a distinguished member and fellow of the SDPS. He has published three books and over 200 articles. He serves as co-editor and editorial board member for five journals. He has organized major conferences and has served the ASME as chair of the Special divisions steering committee, conference planning committee, an executive committee of design division and vice chair of the board on Technical Knowledge Dissemination.

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