

Torsional Waves in Functionally Graded Isotropic Elastic Rods

C. MAEVE MCCARTHY

Murray State University

The purpose of this work is to investigate the influence of material inhomogeneity on the propagation of torsional waves in linearly elastic isotropic rods. The special case of a circular rod with shear modulus depending on the radial coordinate only is examined and the influence of various cases of inhomogeneity on the fundamental frequencies of the rod is assessed. Although the associated Sturm-Liouville problem is singular, the spectrum can be shown to be discrete. Upper bounds on the frequencies are obtained by a Rayleigh-Ritz method. Lower bounds are obtained by an integral equation technique.