EIGENFREQUENCIES OF GENERALLY RESTRAINED TIMOSHENKO BEAMS WITH AN INTERNAL HINGE

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Resumen.

Thispaperdealswiththe free transversevibration of a Timoshenkobeamwithendselasticallyrestrainedagainstrotation and translation, and anarbitrarilylocatedinternalhingeincludingintermediateelasticconstraints. A combination of the Ritz method and theLagrangemultipliermethodisused to determine free vibrationscharacteristics of thementionedbeam.
Trialfunctionsdenotingthetransversedeflections and the normal rotations of thecrosssection of thebeamare expressed in polynomialforms.In order to obtainanindication of theaccuracy of thedevelopedmathematicalmodel, some casesavailable in theliteraturehavebeenconsidered. New results are presentedfordifferentendconditionsand restraintconditions in theintermediateelasticconstraints. Also a comparisonwith a crack modelisincluded.

Palabras clave: Vibrations, Timoshenkobeams, elasticallyrestrained, Lagrangemultiplier, Ritz.