A STUDY ON MODE SHAPES OF BEAMS WITH INTERNAL HINGES AND INTERMEDIATE ELASTIC RESTRAINTS

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Abstract.

Dynamic analysis of structural elements becomes an important design procedure. Anadequate understanding of the free vibration is crucial to the design and performance evaluation of a mechanical system. This work deals with the problem of free vibrations of uniform beams with elastically restrained ends and with internal hinges and intermediate translational restraints.

The main objective of this work is to obtain the minimum stiffness of a elastic restraint that raises a natural frequency of a beam with an internal hinge, to its upper limit. The minimum stiffness is determined by using the derivative of the function which gives the natural frequencies, with respect to the support position. Additionally, the effects on natural frequencies of the presence of two internal hinges are analyzed

Palabras clave: Keywords: Vibrations of beams, intermediate elastic restrictions, structural dynamics, calculus of variations.