

Interval Finite Element Analysis of Thin Plates

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Keywords: *Interval; Interval Finite Elements; Uncertainty; Thin plates; Structural Analysis.*

Abstract

This work extends the previously developed Interval Finite Element for trusses and frames, see Rama Rao, Muhanna and Mullen (2011), to the analysis of thin elastic plates under uncertainty. Uncertainty in loads and material is introduced as intervals. The reduction of overestimation is achieved by using Element-By-Element (EBE) and a special decomposition of stiffness matrix. Furthermore, dependency in element loads is eliminated using the M-matrix formulation, see Mullen and Muhanna (1999). The formulation is based on a variational approach with Lagrange multiplier method by imposing constraints that allows obtaining the primary and derived quantities to be obtained with the same accuracy. Numerical results are illustrated in a number of example problems.

References

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