

Boundary Element Analysis of Systems using Interval Methods

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Abstract

In engineering, most partial differential equations are solved using Finite Element Method. Applications of interval methods have been explored in finite element analysis to model systems with uncertainty in parameters and to account for the impact truncation error on solutions. An alternative to Finite Element Analysis is Boundary Element Method. The Boundary Element Method uses singular functions to reduce the dimension of the approximation by transforming the domain forces and displacements to forces and displacements on the boundaries. In this work, a new method is developed to enhance boundary element method. The method considers impreciseness such as integration errors and/or parametric uncertainty using interval variables. Exemplars are presented to illustrate the effectiveness of interval approach in Boundary Element Method Analysis.