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Abstract title

Stochastic interval dynamic analysis of structures using a combined perturbation and optimization method
Due to inherent variability of material properties, imperfection of construction processes and environmental effects etc., structural parameters and boundary conditions may vary from design considerably. These uncertainties have significant impacts on dynamic characteristics of structures and should be quantified properly in dynamic response analysis. Probabilistic approaches and interval methods have been well developed to solve uncertain problems, while dynamic analysis of structures with mixed random and interval parameters has not been addressed. In this paper, dynamic responses of structures with mixed random and interval parameters are investigated by using a hybrid stochastic and interval approach. Expressions for mean value and variance of dynamic response are derived by using perturbation method. The bounds of these probabilistic characteristics are then determined by optimization method. Numerical examples are given to illustrate feasibility of the proposed method and results are verified by Monte Carlo Simulations.
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