

Formulating the Stochastic Finite Elements for Free Vibration Analysis of Plates with Variable Elastic Modulus

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Abstract : In this study, the effect of uncertainty in elastic modulus of a plate on free vibration response is investigated. For this purpose, the elastic modulus of the plate is modeled as stochastic variable with normal distribution. Moreover, the distance autocorrelation function is used for stochastic field. Then, by applying the finite element method and Monte Carlo simulation, stochastic finite element relations are extracted. Finally, with a numerical test, the effect of uncertainty in the elastic modulus on free vibration response of a plate is studied. The results show that the effect of uncertainty in elastic modulus of the plate cannot play an important role on the free vibration response.

Keywords : stochastic finite elements, plate bending, free vibration, Monte Carlo, Neumann expansion method.

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