

عنوان مقاله:

Stochastic Spectral Cell Method for the Analysis of Structures with Material Uncertainty

محل انتشار:

سیزدهمین کنگره بین المللی مهندسی عمران (سال: 1402)

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خلاصه مقاله:

In this study, a new computational method called stochastic spectral cell method (SSCM) is proposed for analysis of structures with material uncertainty. Spectral cell method is known as a numerical method based on the combination of spectral element method and fictitious domain approach in order to analyze the structures with complex geometries. The SSCM includes the features of spectral cell method in computational stochastic mechanics considering the geometries resulting from computer-aided design (CAD). The SSCM is formulated based on Karhunen-Loève and polynomial chaos expansions for the stochastic analysis of solids and structures. The proposed SSCM can be utilized for both static and dynamic analyses when considering response variability due to material random field. Also, the SSCM uses higher order interpolation functions leading to desirable accuracy for the analyses. Two benchmark problems are provided to demonstrate the efficiency, accuracy and capability of the proposed SSCM.

کلمات کلیدی:

Stochastic spectral cell method, CAD geometry, elastodynamics, computational mechanics, stochastic structural analysis.

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