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基于随机场局部平均的随机有限元法在实特征值问题中的应用

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THE APPLICATION OF THE STOCHASTIC FEM BASED ON THE LOCAL AVERAGES OF RANDOM FIELDS TO RANDOM EIGENVALUE PROBLEMS

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摘要

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摘要

本文将基于随机场局部平均的随机有限元法应用于结构分析中的实特征值问题,给出了2次摄动求随机实特征值和特征向量的1、2阶矩的有限元公式。算例表明,本文方法随单元数的收敛速度比现有的方法快得多,在较少单元数下即可获得满意的结果。

关键词: 随机结构 特征值 有限元法 摄动法

Abstract:

In the present paper the stochastic finite element method based on the local averages of random fields is applied to random eigenvalue problems. The formulas for the means and covariances of random eigenvalue and eigenvectors are derived by using second order perturbation method. The numerical results show that the convergence with increasing element number in the present method is much faster than that in Nakagiri's method, and only a few elements are required to obtain satisfactory results.

Keywords: random structure eigenvalue finite element method perturbation method

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