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多变量Laguerre积分随机有限元方法的研究

Study on the Laguerre Integral Multivariate Stochastic Finite Element Method

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关键词：
Laguerre积分；随机有限元；等直叶片；Laguerre Integral；Stochastic Finite Element；Straight Blade

摘要：
本文在已有的单变量Laguerre积分随机有限元方法的基础上，建立基于Laguerre积分的多变量随机有限元公式，提出了多变量Lagurre积分随机有限元方法(LISFEM)。利用ANSYS的APDL语言二次开发功能，将LISFEM嵌入到ANSYS软件当中，生成相应的计算程序模块，并利用ANSYS的后处理程序，实现随机结构的全节点应力和变形的均值和方差的云图显示。最后，以二回路中汽轮机叶片为例，选择不同的Laguerre积分点数目进行计算，并与解析解进行对比研究，计算结果表明该方法计算效率高，并且采用较少的积分点就能获得较高的计算精度，从而检验了该方法的正确性。

In the existing single variable Laguerre integral stochastic finite element method, based on Laguerre integral multivariate stochastic finite element formula, the author proposed variable Lagurre in- tegral stochastic finite element method (LISFEM). By using APDL of ANSYS, LISFEM was embedded into ANSYS, and corresponding calculation program module was generated, then using the post- processing program of ANSYS, the mean and variance of the whole node's stress and deformation was realized by the cloud image displaying. Finally, took the turbine blade of the two loop as an example, chose different Laguerre integral point number and calculated, then compared with the analytical solution, the calculation results showed that the efficiency of calculating was high, and the less integral point could get high accuracy, so as to test the correctness of this method.

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