论文

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随机谱载荷下含多裂纹结构的概率断裂力学可靠性模型

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THE RELIABILITY MODEL OF THE STRUCTURE WITH MULTI-CRACKS UNDER RANDOM LOADS

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摘要 通过将结构疲劳裂纹在随机谱载荷下的扩展作为一个时间离散的随机过程处理,建立了一个估计各载荷谱周期末的裂纹长度概率分布的裂纹扩展概率断裂力学计算方法。当已知结构裂纹扩展引起的载荷重新分配时,该方法可以给出多裂纹结构随时间变化的各个裂纹的长度的概率分布。在此基础上,本文建立了一个多裂纹结构裂纹相互干扰情况下的结构可靠性模型,并给出了一个简单的算例。

关键词： 概率断裂力学 裂纹扩展 可靠性

Abstract： The present paper presents a method for estimation of the fatigue crack length distribution based on the stochatic processing of time discreted. The strains of the structure containing multiples cracks at each structural detail are changed during the propagation of the cracks. The method can calculate the probability tensity function of each crack. With the crack length distribution, and distribution of the strain level, a model of crack length-KIc interference for the reliability of multi-cracks structure is establised. The reliability - time curve of the structure can be ploted. A sample example is presented.

Keywords： probability fracture mechanic crack growth reliability

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