论文

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基于非线性几何场论求解热弹性板大挠度弯曲的BEM法

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BEM FOR FINITE DEFLECTION OF HEATED ELASTIC THIN PLATES BASED ON GEOMETRICALLY NONLINEAR FIELED THEORY

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摘要 基于理性力学非线性几何场理论,建立了热弹性薄板等效速率形式的Ｋａｒｍａｎ方程,通过将热弹性薄板大挠度弯曲问题看成平板弯曲问题与平面大变形问题的耦合,在固定坐标系及拖带坐标系上推导出两组边界积分方程,从而建立起新的分析热弹性薄板大挠度弯曲的边界元法。算例表明本文方法理论可靠、精度高。

关键词：热弹性薄板 边界元法 大挠度 拖带坐标 瞬时位形

Abstract： On the basis of geometrically nonlinear field theory of rational mechanics,the equi- valent Karman equations in rate form of finite deflection of heated elastic thin plates are given. Transforming the equations into boundary integral equations in two different frames by consider-ing that finite defiection is a coupled problem of small deflection of thin plate and planar finite deformation,a new boundary element method for the problem is set up.Numerical examples demonstrate that the method is accurate and feliable.

Keywords： heated elastic thin plate   BEM   finite deflection   co-moving coordinate   instan-taneous configuration

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