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各向异性板半无限裂纹平面问题的保角变换解法

贾红刚, 聂玉峰

西北工业大学理学院, 西安, 710129

Conformal Mapping Solution of Anisotropic Semi-infinite Crack Plane Problem

Jia Honggang, Nie Yufeng

School of Science, Northwestern Polytechnical University, Xian, 030024

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摘要 本文给出了各向异性板半无限裂纹平面问题的保角变换解. 首先, 简单介绍了各向异性板平面问题的基本理论. 随后采用复变函数的方法, 通过引用适当的保角映射研究了各向异性板半无限裂纹平面弹性问题, 得到了各向异性板中半无限裂纹在任意面内集中载荷作用下的裂纹尖端的应力强度因子的解析解. 最后,作为特例得到了当集中力作用在裂纹表面时的应力强度因子的解析解,依此验证了结果的正确性. 结果表明该方法简单实用.

关键词： 各向异性板 半无限裂纹 复变方法 应力强度因子 保角映射 解析解

Abstract： Conformal mapping solution of anisotropic semi-infinite crack problem is investigated in this paper. Firstly, the principal theory of anisotropic plate plane problem is introduced simply. Subsequently, elastic problem about semi-infinite cracks problem using the technique of conformal mapping with complex variable function method. The analytic solutions of the SIFs at the crack tip are obtained for anisotropic semi-infinite cracks with intensive loading at arbitrary point of the crack plane. Finally, a special case in point, The analytic solutions of the SIFs at the crack tip are obtained for anisotropic semi-infinite cracks with intensive loading at the crack surface. Thereby, the validity of results is verified. The results show that: the method is simple and practical.

Key words： anisotropic plate semi-infinite crack variable complex method SIFs conformal mapping analytic solution

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