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## 一种新的缺陷压电体奇异准协调单元及其断裂分析

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## A New Singular Quasi-compatible Finite Element of Piezoelectric Materials and Its Fracture Analysis

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**摘要** 在缺陷压电体断裂理论分析的基础上构造了一种新的缺陷压电体广义位移模式并建立了有限元断裂分析模型;提出了求解压电体含大曲率缺口广义强度因子等断裂参量的数值分析计算方法。考查了不同结构尺寸、电位移与电场对解的影响,本方法所得的结果与理论解一致,说明了本文方法的有效性。

**关键词：** 压电材料　裂纹　奇异元　强度因子　电位移

**Abstract：** The local solutions of general displacement fields near a crack of piezoelectric materials are first used to construct a new general displacement modelling of crack problems in piezoelectric materials.With the minimum potential energy principle, a finite element version for piezoelectric materials with a blunt crack is proposed.A new singular finite element is constituted and a new method to calculate the general intensity factors of crack problems in piezoelectric materials is obtained. Compared with theoretical solutions, the results obtained by the present method are in good agreement with those of theoretical ones.The results of the different structural dimensions illustrate that the present method is stable, reliable and highly accurate, high efficient and easy to use in practical program operation.

**Keywords：** piezoelectric material　crack　singular element　intensity factor　electric displacement

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