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Stress intensity solutions for cracked orthotropic plates

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Abstract

In this paper, fracture mechanics in orthotropic plates, stress and displacement distributions around the crack tip in an anisotropic material are considered.
Classical displacement based finite elements, elements with penalized equilibrium and elements with drilling degrees of freedom are employed.
The path independent integrals J and I^* are applied to orthotropic fracture mechanics problems to determine the stress intensity factor at the crack tip. Again, convergence studies are done, and the path independence of J and I^* are investigated for orthotropic problems. Numerical results for typical fracture specimens are presented and discussed. The effect of the degree of anisotropy and fiber orientation on the stress intensity factor is also demonstrated.

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