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Diffraction of SH waves by a system of cracks: Solution by an integral equation method.
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The plane problem of an infinite region containing an arbitrary set of straight cracks which are excited by an incident time harmonic SH wave is investigated. Using the representation theorem for the displacements, the boundary value problem is formulated in terms of singular integral equations for the displacement jump across the cracks. An appropriate expansion of the unknown function into Chebyshev polynomials leads to a system of algebraic equations for the expansion coefficients; the latter are directly connected with the dynamic stress intensity factors. As examples various configurations of two cracks loaded by plane waves of different incident angles are considered and numerical results are presented.

MSC:
74J20 Wave scattering in solid mechanics
74R05 Brittle damage
74G70 Stress concentrations, singularities in solid mechanics
74J10 Bulk waves in solid mechanics

Keywords:
Galerkin method; interaction phenomena; plane problem; infinite region; arbitrary set of straight cracks; incident time harmonic SH wave; representation theorem; displacements; boundary value problem; singular integral equations for the displacement jump; Chebyshev polynomials; system of algebraic equations; dynamic stress intensity factors

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