FSM3L_11950

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Explicit Secular Equations for Surface and Interface Waves in Anisotropic Solids

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Many problems of anisotropic elasticity have been beautifully addressed by the now-called Stroh-Barnett-Lothe formalism; in particular, the questions of existence and uniqueness were solved for surface and interface waves in crystals, and numerical schemes were elaborated for the determination of the speeds of propagation. However, explicit secular equations remain rare outside certain high symmetry/special boundary conditions contexts. Here a novel and efficient method is proposed, which permits the derivation of such secular equations for a great variety of surface and interface wave problems. It does not rely on the above formalism and requires only elementary algebraic manipulations. It is applicable, among other possibilities, to: linear anisotropic elasticity; small motions superposed on large static homogeneous deformations; rotating bodies; solid/vacuum, solid/solid, solid/fluid interfaces; or several combinations of these contexts.

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