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Abstract Piezoelectric materials are widely used in electromechanical sensor, actuator and transducer in the decade. It is

important to analysis the behavior of mechanics for piezoelectric material due to the fracture by heat, contact and force. The

governing equations between the anisotropic planar problem and piezoelectric planar problem are similar. In the paper, the

analytical solution of anisotropic plane problem is derived firstly. By the corresponding material constant between anisotropic

and piezoelectric material, the analytical solution for piezoelectric material problem can be derived. In the paper, the general solution of anisotropic planar problem is obtained with aid of Lekhniskii formulation and Fourier

transform. Punch problem is mixed boundary value problem and is hard to solve directly. In the paper, the full-field solutions of

the punch problem can be obtained by dividing the problem into two pares: the surface Green’s function of the anisotropic

problem and the surface traction solved by boundary integral equation. The Green’s function of anisotropic in-plane, anti-plane

and coupled problem are constricted by combining varies boundary conditions and material constants. The integral equations are

constructed by surface displacement and surface traction relation. The integral equation in conjunction with the contact

conditions are used to obtain the contact traction in the contact region. Employing the surface traction under the punch into the

Green's function of anisotropic body and the full-field solution of the associated punch problem can be derived.
An exact correspondence is existed between the plane piezoelectric equations and those of generalized plane strain in elasticity.

In the paper, the punch problem of anisotropic body is solved directly. The coefficient transformation is introduced in this study

to obtain the punch problem of plane piezoelectric elasticity. Numerical results for the full-field stress and electric distribution of

particular material, i.e. PZT-4 and PZT-5, are presented in the study. The results are helpful to analyze the elastic behavior of

piezoelectric body subjected to indentation of punch.
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