Displacement waves in saturated thermoelastic porous media. I. Basic equations

Jacob Bear

Albert and Anne Mansfield Chair in Water Resources, Technion–Israel Institute of Technology, Haifa 32000, Israel

Shaul Sorek

J. Blaustein Desert Research Institute, Ben-Gurion University, of the Negev, Sede Boker, Israel

Gabi Ben-Dor

Mechanical Engineering, Ben-Gurion University of the Negev, Beer Sheva, Israel

Gedalia Mazor

Mechanical Engineering, Ben-Gurion University of the Negev, Beer Sheva, Israel

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A complete set of macroscopic equations, the solution of which describes fluid and solid stresses, displacements and temperatures, evolving from an excitation of a saturated porous medium domain in the form of an abrupt pressure and temperature changes applied at the domain's boundary is presented. The fluid is a compressible Newtonian one and the solid is thermoelastic. Nonisothermal conditions prevail. The set of equations includes mass, momentum and energy balance equations, constitutive relations and definitions. A simple example indicates that the fluid and solid displacements are described by two coupled wave equations.

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