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Finite element analyses of anisotropic poroelasticity: A generalized Mandel's problem and an inclined borehole problem. (English) Zbl 0859.73073
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Summary: The finite element equations for nonlinear, anisotropic poroelasticity are cast in the form of measurable engineering constants. Two problems of importance to the rock and petroleum industry are analysed by the FEM. First, the classical Mandel's problem with an extension to transversely isotropic case is investigated. Second, the problem of an inclined borehole is explored. In particular, the effect of material anisotropy on stress concentration near the wall with implication to borehole instability is examined in detail.

MSC:

74S05 Finite element methods applied to problems in solid mechanics
74L10 Soil and rock mechanics
74E10 Anisotropy in solid mechanics

Cited in **5** Documents

Keywords:

petroleum industry; transversely isotropic case; effect of material anisotropy on stress concentration

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