ELASTIC CONSOLIDATION SETTLEMENT DUE TO PERIODIC PUMPING

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Abstract

This paper presents the ground surface displacements induced by periodic groundwater withdrawal in a homogeneous isotropic poroelastic half space. The formulation of the mathematical model is based on Biot's consolidation theory of porous media. Using Laplace-Hankel integral transforms, the closed-form solutions of the transient consolidation deformations are derived. The solutions can be used to evaluate numerical models and numerical simulations of the poroelastic consolidation of a saturated porous aquifer due to periodic groundwater withdrawal.

Keyword：Periodic Pumping, Point Sink, Closed-form Solution, Half Space.