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6 CHAPTER1 INTRODUCTION Figure 11: Water-level fluctuations due to a passing trainAn approaching train compresses the aquifer, which quickly raises the pore pressure in the affected

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Theory of Linear Poroelasticity with Applications to Geomechanics and Hydrogeology Herbert F Wang PRINCETON UN IV E RSITY PRESS · PRINCETON ANO OXFORD

elasticity of porous med 13 - esag.harvard.edu

Elasticity of Fluid-Infiltrated Porous Solids (Poroelasticity) James R Rice, Harvard University, November 1998 (revised list of references, August 2001

and April ...

Linear Poroelasticity - Northwestern Engineering

[2] is followed here Detournay and Cheng [3] have recently given a detailed discussion of the theory with a variety of solutions, especially for borehole

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2014 Drucker Medal Paper: A Derivation of the Theory of Linear Poroelasticity From Chemoelasticity Citation Anand, Lallit "2014 Drucker Medal Paper: A Derivation of the

arXiv:1607.04274v1 [physics.geo-ph] 14 Jul 2016

An introduction to linear poroelasticity July 18, 2016 Andi Merxhani 1 am3232@caacolumbiaedu July 18, 2016 This study is an introduction to the theory of poroelasticity expressed in terms of Biot's theory of three-dimensional consolidation The point of departure in the description are the basic equations of elasticity (ie constitutive law, equations of equilibrium in terms of stresses

Linear Poroelastic Cancellous Bone Anisotropy: Trabecular ...

Linear Poroelastic Cancellous Bone Anisotropy: Trabecular Solid Elastic and Fluid Transport Properties The mechanical performance of cancellous bone is characterized using experiments which apply linear poroelasticity theory It is hypothesized that the anisotropic organization of the solid and pore volumes of cancellous bone can be physically characterized separately (no deformable boundary

Poroelasticity of a covalently crosslinked alginate ...

using the theory of linear poroelasticity A comparison of the relaxation curve recorded in the experiment and that derived from the theory determines the elastic constants and the permeability of the gel The material constants so determined agree well with those determined by using a recently developed indentation method Furthermore, during relaxation, the concentration of water in the gel

A stabilized finite element method for nonlinear poroelasticity

A stabilized finite element method for nonlinear poroelasticity Lorenz Berger¹, Rafel Bordas², David Kay³ and Simon Tavener⁴ Abstract We construct a stabilized finite-element method to compute flow and nonlinear deformations in an incompressible poroelastic medium We employ a three-field mixed formulation to calculate displacement, fluid flux and pressure directly and introduce a

Emmanuel Detournay and Alexander H.-D. Cheng

is Biot who in 1935³ and 1941⁴ first developed a linear theory of poroelasticity that is consistent with the two basic mechanisms outlined above Essentially the same theory has been reformulated several times by Biot himself,^{18–21} by Verruijt⁵ in a specialized version for soil mechanics, and also by Rice and Cleary⁸ who linked the poroelastic parameters to concepts that are well

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Refresher of Biot's static poroelasticity model Biot's dynamic poroelastic model from the non-equilibrium filtration theory Low frequency reflections from a plane interface between an elastic and an elastic fluid-saturated layers Different asymptotic regimes of the low-frequency reflections Conclusions 120505 - p12/31 Biot Theory The isotropic, permeable porous rock, and the

NONLINEAR AND SEMILINEAR DYNAMIC POROELASTICITY WITH ...

NONLINEAR AND SEMILINEAR DYNAMIC POROELASTICITY WITH MICROSTRUCTURE James G Berryman Lewis Thigpen This paper was prepared for submittal to Journal of Geophysical Research October 1983 Published in J of Mech Phy Solids, Vol 33 (2), Pp 97-116, 1985 DISCLAIMER

This document was prepared as an account of work sponsored by an agency of the United States ...

Poroelasticity, or migration of matter in elastic solids ...

H F Wang, Theory of linear poroelasticity with applications to geomechanics and hydrogeology Princeton University Press, 2000 Swelling gels A large quantity of small molecules may migrate into a network of long polymers, causing the network to swell, forming an aggregate known as a polymeric gel When the solvent is water, the gel is called a hydrogel The polymers are flexible and

Nonlinear Poroelasticity for a Layered Medium

Nonlinear poroelasticity for a layered medium Andrew N Norris Department of Mechanical and Aerospace Engineering, Rutgers University, Piscataway); New Jersey 08855-0909 Michael A Grinfeld Department of Mathematics, Rutgers University, Piscataway, New Jersey 08855-0909 (Received 19 July 1994; accepted for publication 23 March 1995) The equations of motion and the nonlinear constitutive ...