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In Mechanics of Poroelastic Media the classical theory of poroelasticity developed by Biot is developed and extended to the study of problems in geomechanics, biomechanics, environmental mechanics and materials science. The contributions are grouped into sections covering constitutive modelling, analytical aspects, numerical modelling, and ...

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Mechanics of Poroelastic Media (eBook, 1996) [WorldCat.org]
Analyses of waves in 3-d poroelastic media. H. Antes, T. Wiebe. Pages 371-387. Back Matter. Pages 389-398. PDF. About this book. Keywords. biomechanics fracture mechanics numerical modelling porous media solids stress . Editors and affiliations. A. P. S. Selvadurai. 1; 1. Department of Civil Engineering and Applied Mechanics McGill University ...

Mechanics of Poroelastic Media | SpringerLink
Mechanics of Poroelastic Media J. W. Rudnicki (auth.) , A. P. S. Selvadurai (eds.) In Mechanics of Poroelastic Media the classical theory of poroelasticity developed by Biot is developed and extended to the study of problems in geomechanics, biomechanics, environmental mechanics and materials science.

Mechanics of Poroelastic Media | J. W. Rudnicki (auth.), A ...
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Mechanics of Poroelastic Media | A.P.S. Selvadurai | Springer
Definition. Poroelasticity is a field in materials science and mechanics that studies the interaction between fluid flow and solids deformation within a linear porous medium and it is an extension of elasticity and porous medium flow (diffusion equation). The deformation of the medium influences the flow of the fluid and vice versa.

Poroelasticity - Wikipedia
One of the key findings of the theory of poroelasticity is that in poroelastic media there exist three types of elastic waves: a shear or transverse wave, and two types of longitudinal or compressional waves, which Biot called type I and type II waves. The transverse and type I (or fast) longitudinal wave are similar to the transverse and longitudinal waves in an elastic solid, respectively.

Poromechanics - Wikipedia
In Mechanics of Poroelastic Media the classical theory of poroelasticity developed by Biot is developed and extended to the study of problems in geomechanics, biomechanics, environmental mechanics and materials science. The contributions are grouped into sections covering constitutive...

Mechanics of Poroelastic Media by A.P.S. Selvadurai ...
A new paper on the indentation of poroelastic media has been published by our group. In this work, we demonstrate the use of a "master curve" database for fast identification of poroelastic properties (elastic modulus, drained Poisson's ratio and hydraulic permeability) from an indentation creep (displacement-time) curve.

Poroelastic properties from indentation tests | iMechanica
Series: Solid Mechanics and Its Applications (Book 35) Paperback: 412 pages; Publisher: Springer; Softcover reprint of hardcover 1st ed. 1996 edition (December 7, 2010) Language: English; ISBN-10: 9048145139; ISBN-13: 978-9048145133; Product Dimensions: 6.1 x 0.9 x 9.1 inches Shipping Weight: 1.6 pounds (View shipping rates and policies)

Amazon.com: Mechanics of Poroelastic Media (Solid ...
Mechanics of Poroelastic Media Volume 35 of Solid Mechanics and Its Applications: Editor: A.P.S. Selvadurai: Edition: illustrated: Publisher: Springer Science & Business Media, 1996: ISBN:...

Mechanics of Poroelastic Media - Google Books
Exact time domain solutions for displacement and porepressure are derived for waves emanating from a pressurized spherical cavity, in an infinitely permeable poroelastic medium with a permeable boundary. Cases for blast and exponentially decaying step pulse loadings are considered; letter case, in the limit as decay constant goes to zero, also covers the step (uniform) pressure.

Spherical Wave Propagation in a Poroelastic Medium with ...
The stress-induced failure of cavities in poroelastic media is investigated using an analytical solution of the elastic matrix inclusion problem of Eshelby and a rock failure criterion. The elastic properties of the porous matrix surrounding the cavity are modeled using a self-consistent version of ...

Mechanical failure of cavities in poroelastic media ...
The fluid phase is formulated with respect to the Lagrangian finite element mesh, following the solid phase deformation. The ISM is discretized with an independent Lagrangian mesh and may behave arbitrarily complex (it may, eg, be compressible, grow, and perform active deformations). We model two distinct types of interactions, namely, (1) the immersed fluid?structure interaction (FSI) between the ISM and the fluid phase in the PM and (2) the immersed structure?structure interaction (SSI

A coupled approach for fluid saturated poroelastic media ...
In Mechanics of Poroelastic Media the classical theory of poroelasticity developed by Biot is developed and extended to the study of problems in geomechanics, biomechanics, environmental mechanics and materials science. The contributions are grouped into sections covering constitutive modelling, analytical aspects, numerical modelling, and ...

Mechanics of Poroelastic Media book by A. P. S. Selvadurai ...
The flow and mechanics of poroelastic media and the contact mechanics of elastic bodies are well?developed research fields. For a porous or poroelastic medium, we refer to the classical textbooks. 1 , 2 There exists an extensive number of discretizations for the elliptic equations describing fluid flow in a porous medium, and they all have different merits.

Finite volume discretization for poroelastic media with ...
The evolution of damage introduces alterations in both the hydraulic conductivity and skeletal elasticity properties of the poroelastic solid. The paper examines the fluid-filled spherical cavity problem with a view to establishing the influence of the stress state-dependent damage on the amplification and decay of the fluid pressure in the spherical cavity.

The Fluid-filled Spherical Cavity in a Damage-susceptible ...
1) Highlights in the historical development of porous media theory: toward a consistent macroscopic theory. de Boer, Reint, Applied Mechanics Review, 49:201-262, 1996. 2) Mow VC, Kuei SC, Lai WM, Armstrong CG: Biphasic creep and stress relaxation of articular cartilage in compression: Theory and Experiment,

Poroelasticity, or migration of matter in elastic solids ...
galactique, modern electric traction h partab book to, mechanics of poroelastic media reprint, rational choice in an uncertain world, libro pmp rita, mixed mole problems answers pg 53, papal heraldry galbreath donald l, randi bana diya mujhe, rain before falls coe jonathan vikinglondon,

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Liang-Ping Yi, Haim Waisman, Zhao-Zhong Yang, Xiao-Gang Li, A consistent phase field model for hydraulic fracture propagation in poroelastic media, Computer Methods in Applied Mechanics and Engineering, 10.1016/j.cma.2020.113396, 372, (113396), (2020).

In Mechanics of Poroelastic Media the classical theory of poroelasticity developed by Biot is developed and extended to the study of problems in geomechanics, biomechanics, environmental mechanics and

materials science. The contributions are grouped into sections covering constitutive modelling, analytical aspects, numerical modelling, and applications to problems. The applications of the classical theory of poroelasticity to a wider class of problems will be of particular interest. The text is a standard reference for researchers interested in developing mathematical models of poroelasticity in geoenvironmental mechanics, and in the application of advanced theories of poroelastic biomaterials to the mechanics of biomaterials.

This book treats the mechanics of porous materials infiltrated with a fluid (poromechanics), focussing on its linear theory (poroelasticity). Porous materials from inanimate bodies such as sand, soil and rock, living bodies such as plant tissue, animal flesh, or man-made materials can look very different due to their different origins, but as readers will see, the underlying physical principles governing their mechanical behaviors can be the same, making this work relevant not only to engineers but also to scientists across other scientific disciplines. Readers will find discussions of physical phenomena including soil consolidation, land subsidence, slope stability, borehole failure, hydraulic fracturing, water wave and seabed interaction, earthquake aftershock, fluid injection induced seismicity and heat induced pore pressure spalling as well as discussions of seismoelectric and seismoelectromagnetic effects. The work also explores the biomechanics of cartilage, bone and blood vessels. Chapters present theory using an intuitive, phenomenological approach at the bulk continuum level, and a thermodynamics-based variational energy approach at the micromechanical level. The physical mechanisms covered extend from the quasi-static theory of poroelasticity to poroelastodynamics, poroviscoelasticity, porothermoelasticity, and porochemoelasticity. Closed form analytical solutions are derived in details. This book provides an excellent introduction to linear poroelasticity and is especially relevant to those involved in civil engineering, petroleum and reservoir engineering, rock mechanics, hydrology, geophysics, and biomechanics.

Mechanics and Physics of Porous Solids addresses the mechanics and physics of deformable porous materials whose porous space is filled by one or several fluid mixtures interacting with the solid matrix. Coussy uses the language of thermodynamics to frame the discussion of this topic and bridge the gap between physicists and engineers, and organises the material in such a way that individual phases are explored, followed by coupled problems of increasing complexity. This structure allows the reader to build a solid understanding of the physical processes occurring in the fluids and then porous solids. Mechanics and Physics of Porous Solids offers a critical reference on the physics of multiphase porous materials - key reading for engineers and researchers in structural and material engineering, concrete, wood and materials science, rock and soil mechanics, mining and oil prospecting, biomechanics.

The disturbed state concept (DSC) is a unified, constitutive modelling approach for engineering materials that allows for elastic, plastic, and creep strains, microcracking and fracturing, stiffening or healing, all within a single, hierarchical framework. Its capabilities go well beyond other available material models yet lead to significant simplifications for practical applications. Until now, however, there has been no resource that fully describes the theory, techniques, and potential of this powerful method. Mechanics of Materials and Interfaces: Disturbed State Concept presents a detailed theoretical treatment of the DSC and shows that it can provide a unified and simplified approach for mathematical characterization of the mechanical response of materials and interfaces. Within this comprehensive treatment, the author: Compares the DSC with other available models Identifies the physical meaning of the relevant parameters and presents procedures to determine them from laboratory test data Validates the DSC models with respect to laboratory tests used to find the parameters and independent tests not used in the calibration Implements the models in computer procedures Validates those procedures by comparing predictions with observations from simulated and field boundary value problems Solves problems from a variety of disciplines, including civil, mechanical, and electrical engineering If you are involved in the mechanics of materials, you owe it to yourself to explore the disturbed state concept.

Mechanics of Materials and Interfaces provides the first-and to date, the only-comprehensive means of doing so.

The structures of living tissues are continually changing due to growth and response to the tissue environment, including the mechanical environment. Tissue Mechanics is an in-depth look at the mechanics of tissues. Tissue Mechanics describes the nature of the composite components of a tissue, the cellular processes that produce these constituents, the assembly of the constituents into a hierarchical structure, and the behavior of the tissue's composite structure in the adaptation to its mechanical environment. Organized as a textbook for the student needing to acquire the core competencies, Tissue Mechanics will meet the demands of advanced undergraduate or graduate coursework in Biomedical Engineering, as well as, Chemical, Civil, and Mechanical Engineering. Key features: Detailed Illustrations Example problems, including problems at the end of sections A separate solutions manual available for course instructors A website (http://tissue-mechanics.com/) that has been established to provide supplemental material for the book, including downloadable additional chapters on specific tissues, downloadable PowerPoint presentations of all the book's chapters, and additional exercises and examples for the existing chapters. About the Authors: Stephen C. Cowin is a City University of New York Distinguished Professor, Departments of Biomedical and Mechanical Engineering, City College of the City University of New York and also an Adjunct Professor of Orthopaedics, at the Mt. Sinai School of Medicine in New York, New York. In 1985 he received the Society of Tulane Engineers and Lee H. Johnson Award for Teaching Excellence and a recipient of the European Society of Biomechanics Research Award in 1994. In 1999 he received the H. R. Lissner medal of the ASME for contributions to biomedical engineering. In 2004 he was elected to the National Academy of Engineering (NAE) and he also received the Maurice A. Biot medal of the American Society of Civil Engineers (ASCE). Stephen B. Doty is a Senior Scientist at Hospital for Special Surgery, New York, New York and Adjunct Professor, School of Dental and Oral Surgery, Columbia University, New York, NY. He has over 100 publications in the field of anatomy, developmental biology, and the physiology of skeletal and connective tissues. His honors include several commendations for participation in the Russian/NASA spaceflights, the Spacelab Life Science NASA spaceflights, and numerous Shuttle missions that studied the influence of spaceflight on skeletal physiology. He presently is on the scientific advisory board of the National Space Biomedical Research Institute, Houston, Texas.

This dictionary offers clear and reliable explanations of over 100 keywords covering the entire field of non-classical continuum mechanics and generalized mechanics, including the theory of elasticity, heat conduction, thermodynamic and electromagnetic continua, as well as applied mathematics. Every entry includes the historical background and the underlying theory, basic equations and typical applications. The reference list for each entry provides a link to the original articles and the most important in-depth theoretical works. Last but not least, ever y entry is followed by a cross-reference to other related subject entries in the dictionary.

F.K. Lehner: A Review of the Linear Theory of Anisotropic Poroelastic Solids. - J.W. Rudnicki: Eshelby's Technique for Analyzing Inhomogeneities in Geomechanics. - Y. Gueguen, M. Kachanov: Effective Elastic Properties of Cracked and Porous Rocks - an Overview. - J.L. Raphanel: 3D Morphology Evolution of Solid-Fluid Interfaces by Pressure Solution. - Y.M. Leroy: An Introduction to the Finite-Element Method for Linear and Non-linear Static Problems. The mechanical behaviour of the earth's upper crust enters into a great variety of questions in different areas of the geological and geophysical sciences as well as in the more applied geotechnical disciplines. This volume presents a selection of papers from a CISM course in Udine on this topic. While each of these chapters will make for a useful contribution in its own right, the present bundle also illustrates, by way of examples, the variety of theoretical concepts and tools that are currently brought to bear on earth deformation studies, ranging from reviews of poroelastic field theory to micro-mechanical and homogenization studies, chemomechanics and interfacial stability theory of soluble solids under stress, and finally to an introduction to the finite element method.

This book treats the mechanics of porous materials infiltrated with a fluid (poromechanics), focussing on its linear theory (poroelasticity). Porous materials from inanimate bodies such as sand, soil and rock, living bodies such as plant tissue, animal flesh, or man-made materials can look very different due to their different origins, but as readers will see, the underlying physical principles governing their mechanical behaviors can be the same, making this work relevant not only to engineers but also to scientists across other scientific disciplines. Readers will find discussions of physical phenomena including soil consolidation, land subsidence, slope stability, borehole failure, hydraulic fracturing, water wave and seabed interaction, earthquake aftershock, fluid injection induced seismicity and heat induced pore pressure spalling as well as discussions of seismoelectric and seismoelectromagnetic effects. The work also explores the biomechanics of cartilage, bone and blood vessels. Chapters present theory using an intuitive, phenomenological approach at the bulk continuum level, and a thermodynamics-based variational energy approach at the micromechanical level. The physical mechanisms covered extend from the quasi-static theory of poroelasticity to poroelastodynamics, poroviscoelasticity, porothermoelasticity, and porochemoelasticity. Closed form analytical solutions are derived in details. This book provides an excellent introduction to linear poroelasticity and is especially relevant to those involved in civil engineering, petroleum and reservoir engineering, rock mechanics, hydrology, geophysics, and biomechanics.

This book presents a concise description of the acoustics of ocean sediment acoustics, including the latest developments that address the discrepancies between theoretical models and experimental measurements. This work should be of interest to ocean acoustic engineers and physicists, as well as graduate students and course instructors. The seabed is neither a liquid nor a solid, but a fluid saturated porous material that obeys the wave equations of a poroelastic medium, which are significantly more complicated than the equations of either a liquid or a solid. This volume presents a model of seabed acoustics with input parameters that allow the model to cover a wide range of sediment types. The author includes example reflection and transmission curves which may be used as typical for a range of sediment types. The contents of this book will allow the reader to understand the physical processes involved in the reflection, propagation, and attenuation of sound and shear waves in ocean sediments and to model the acoustic properties for a wide range of applications.