

1. Record Nr.	UNISA996454749203316
Autore	Coussy Olivier
Titolo	Poromechanics [[electronic resource] /] / Olivier Coussy
Pubbl/distr/stampa	Chichester, England ; ; Hoboken, NJ, : Wiley, c2004
ISBN	1-280-26936-7 9786610269365 0-470-09270-X 0-470-09271-8
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (314 p.)
Altri autori (Persone)	CoussyOlivier
Disciplina	620.1/1692 620.11692
Soggetti	Porous materials - Mechanical properties Porous materials - Mechanical properties - Mathematical models Continuum mechanics Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Previous ed. published as: Mechanics of porous continua. 1995.
Nota di bibliografia	Includes bibliographical references (p. [285]-292) and index.
Nota di contenuto	Poromechanics; Contents; Preface; Acknowledgements; 1 Deformation and Kinematics. Mass Balance; 1.1 The Porous Medium and the Continuum Approach; 1.1.1 Connected and Occluded Porosity. The Matrix; 1.1.2 Skeleton and Fluid Particles. Continuity Hypothesis; 1.2 The Skeleton Deformation; 1.2.1 Deformation Gradient and Transport Formulae; 1.2.2 Eulerian and Lagrangian Porosities. Void Ratio; 1.2.3 Strain Tensor; 1.2.4 Infinitesimal Transformation and the Linearized Strain Tensor; 1.3 Kinematics; 1.3.1 Particle Derivative; 1.3.2 Strain Rates; 1.4 Mass Balance; 1.4.1 Equation of Continuity 1.4.2 The Relative Flow Vector of a Fluid Mass. Filtration Vector. Fluid Mass Content 1.5 Advanced Analysis; 1.5.1 Particle Derivative with a Surface of Discontinuity; 1.5.2 Mass Balance with a Surface of Discontinuity. The Rankine-Hugoniot Jump Condition; 1.5.3 Mass Balance and the Double Porosity Network; 2 Momentum Balance. Stress Tensor; 2.1 Momentum Balance; 2.1.1 The Hypothesis of Local Forces; 2.1.2 The Momentum Balance; 2.1.3 The Dynamic Theorem; 2.2 The Stress Tensor; 2.2.1 Action-Reaction Law; 2.2.2 The Tetrahedron

Lemma and the Cauchy Stress Tensor; 2.3 Equation of Motion  
2.3.1 The Local Dynamic Resultant Theorem 2.3.2 The Dynamic  
Moment Theorem and the Symmetry of the Stress Tensor; 2.3.3 Partial  
Stress Tensor; 2.4 Kinetic Energy Theorem; 2.4.1 Strain Work Rates;  
2.4.2 Piola-Kirchhoff Stress Tensor; 2.4.3 Kinetic Energy Theorem; 2.5  
Advanced Analysis; 2.5.1 The Stress Partition Theorem; 2.5.2  
Momentum Balance and the Double Porosity Network; 2.5.3 The  
Tortuosity Effect; 3 Thermodynamics; 3.1 Thermostatistics of  
Homogeneous Fluids; 3.1.1 Energy Conservation and Entropy Balance;  
3.1.2 Fluid State Equations. Gibbs Potential; 3.2 Thermodynamics of  
Porous Continua  
3.2.1 Postulate of Local State 3.2.2 The First Law; 3.2.3 The Second  
Law; 3.3 Conduction Laws; 3.3.1 Darcy's Law; 3.3.2 Fourier's Law; 3.4  
Constitutive Equations of the Skeleton; 3.4.1 State Equations of the  
Skeleton; 3.4.2 Complementary Evolution Laws; 3.5 Recapitulating the  
Laws; 3.6 Advanced Analysis; 3.6.1 Fluid Particle Head. Bernoulli  
Theorem; 3.6.2 Thermodynamics and the Double Porosity Network;  
3.6.3 Chemically Active Porous Continua; 4 Thermoporoelasticity; 4.1  
Non-linear Thermoporoelastic Skeleton; 4.1.1 Infinitesimal  
Transformation and State Equations  
4.1.2 Tangent Thermoporoelastic Properties 4.1.3 The Incompressible  
Matrix and the Effective Stress; 4.2 Linear Thermoporoelastic Skeleton;  
4.2.1 Linear Thermoporoelasticity; 4.2.2 Isotropic Linear  
Thermoporoelasticity; 4.2.3 Relations Between Skeleton and Matrix  
Properties; 4.2.4 Anisotropic Poroelasticity; 4.3 Thermoporoelastic  
Porous Material; 4.3.1 Constitutive Equations of the Saturating Fluid;  
4.3.2 Constitutive Equations of the Porous Material; 4.4 Advanced  
Analysis; 4.4.1 Non-linear Isotropic Poroelasticity; 4.4.2 Brittle Fracture  
of Fluid-infiltrated Materials  
4.4.3 From Poroelasticity to the Swelling of Colloidal Mixtures

---

## Sommario/riassunto

Modelling and predicting how porous media deform when subjected to external actions and physical phenomena, including the effect of saturating fluids, are of importance to the understanding of geophysics and civil engineering (including soil and rock mechanics and petroleum engineering), as well as in newer areas such as biomechanics and agricultural engineering. Starting from the highly successful First Edition, Coussy has completely re-written Mechanics of Porous Continua/Poromechanics to include: New material for: Partially saturated porous media Reactive porous me

---