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Nota di contenuto	Flow and Transport in Porous Media and Fractured Rock; Contents; Preface to the Second Edition; Preface to the First Edition; 1 Continuum versus Discrete Models; 1.1 A Hierarchy of Heterogeneities and Length Scales; 1.2 Long-Range Correlations and Connectivity; 1.3 Continuum versus Discrete Models; 2 The Equations of Change; 2.1 The Mass Conservation Equation; 2.2 The Momentum Equation; 2.3 The Diffusion and Convective-Diffusion Equations; 2.4 Fluid Flow in Porous Media; 3 Characterization of Pore Space Connectivity: Percolation Theory; 3.1 Network Model of a Porous Medium 3.2 Percolation Theory 3.2.1 Bond and Site Percolation; 3.2.2 Computer Simulation and Counting the Clusters; 3.2.3 Bicontinuous Porous

Materials; 3.3 Connectivity and Clustering Properties; 3.4 Flow and Transport Properties; 3.5 The Sample-Spanning Cluster and Its Backbone; 3.6 Universal Properties; 3.7 The Significance of Power Laws; 3.8 Dependence of Network Properties on Length Scale; 3.9 Finite-Size Effects; 3.10 Random Networks and Continuum Models; 3.11 Differences between Network and Continuum Models; 3.12 Porous Materials with Low Percolation Thresholds
3.13 Network Models with Correlations
3.14 A Glance at History; 4 Characterization of the Morphology of Porous Media; 4.1 Porosity; 4.2 Fluid Saturation; 4.3 Specific Surface Area; 4.4 The Tortuosity Factor; 4.5 Correlations in Porosity and Pore Sizes; 4.6 Surface Energy and Surface Tension; 4.7 Laplace Pressure and the Young-Laplace Equation; 4.8 Contact Angles and Wetting: The Young-Dupre Equation; 4.9 The Washburn Equation and Capillary Pressure; 4.10 Measurement of Capillary Pressure; 4.11 Pore Size Distribution; 4.12 Mercury Porosimetry; 4.12.1 Pore Size Distribution
4.12.2 Pore Length Distribution
4.12.3 Pore Number Distribution; 4.12.4 Pore Surface Distribution; 4.12.5 Particle Size Distribution; 4.12.6 Pore Network Models; 4.12.7 Percolation Models; 4.13 Sorption in Porous Media; 4.13.1 Classifying Adsorption Isotherms and Hysteresis Loops; 4.13.2 Mechanisms of Adsorption; 4.13.3 Adsorption Isotherms; 4.13.4 Distributions of Pore Size, Surface, and Volume; 4.13.5 Pore Network Models; 4.13.6 Percolation Models; 4.14 Pore Size Distribution from Small-Angle Scattering Data; 4.15 Pore Size Distribution from Nuclear Magnetic Resonance
4.16 Determination of the Connectivity of Porous Media
4.17 Fractal Properties of Porous Media; 4.17.1 Adsorption Methods; 4.17.2 Chord-Length Measurements; 4.17.3 The Correlation Function Method; 4.17.4 Small-Angle Scattering; 4.17.5 Porosity and Pore Size Distribution of Fractal Porous Media; 5 Characterization of Field-Scale Porous Media: Geostatistical Concepts and Self-Affine Distributions; 5.1 Estimators of a Population of Data; 5.2 Heterogeneity of a Field-Scale Porous Medium; 5.2.1 The Dykstra-Parsons Heterogeneity Index; 5.2.2 The Lorenz Heterogeneity Index
5.2.3 The Index of Variation

Sommario/riassunto

In this standard reference of the field, theoretical and experimental approaches to flow, hydrodynamic dispersion, and miscible displacements in porous media and fractured rock are considered. Two different approaches are discussed and contrasted with each other. The first approach is based on the classical equations of flow and transport, called 'continuum models'. The second approach is based on modern methods of statistical physics of disordered media; that is, on 'discrete models', which have become increasingly popular over the past 15 years. The book is unique in its scope, since (1) the
