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Autore	Zhang Fengshou
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Altri autori (Persone)	DamjanacBranko FurtneyJason
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Nota di contenuto	Chapter 1: Introduction to the Discrete Element Method (DEM) and Related Fluid Mechanics Concepts -- Chapter 2: Discrete Element Modeling of Hydraulic Fracturing -- Chapter 3: DEM Coupled with Computational Fluid Dynamics (CFD) -- Chapter 4: DEM Coupled with Dynamic Fluid Mesh (DFM) -- Chapter 5: DEM Coupled with Lattice-Boltzmann Method (LBM) -- Chapter 6: Hydraulic Stimulation of Naturally Fractured Reservoirs -- Chapter 7: Models of Stimulation and

Production from Enhanced Geothermal Systems -- Chapter 8: Hydraulic Fracturing Induced Fault Reactivation -- Chapter 9: 3D Lattice Modeling of Hydraulic Fracturing in Naturally Fractured Reservoirs -- Chapter 10: Heat Advection and Forced Convection in a Lattice Code -- Chapter 11: Near Wellbore HF Propagation for Different Perforation Models -- Chapter 12: Design of Extreme Limited Entry Perforation.

Sommario/riassunto

The subject of thermo-hydro-mechanical coupled processes in fractured rock masses has close relevance to energy-related deep earth engineering activities, such as enhanced geothermal systems, geological disposal of radioactive waste, sequestration of CO2, long-term disposal of waste water and recovery of hydrocarbons from unconventional reservoirs. Despite great efforts by engineers and researchers, comprehensive understanding of the thermo-hydro-mechanical coupled processes in fractured rock mass remains a great challenge. The discrete element method (DEM), originally developed by Dr. Peter Cundall, has become widely used for the modeling of a rock mass, including its deformation, damage, fracturing and stability. DEM modeling of the coupled thermo-hydro-mechanical processes in fractured rock masses can provide some unique insights, to say the least, for better understanding of those complex issues. The authors of this book have participated in various projects involving DEM modeling of coupled thermo-hydro-mechanical processes during treatment of a rock mass by fluid injection and/or extraction and have provided consulting services to some of the largest oil-and-gas companies in the world. The breadth and depth of our engineering expertise are reflected by its successful applications in the major unconventional plays in the world, including Permian, Marcellus, Bakken, Eagle Ford, Horn River, Chicontepec, Sichuan, Ordos and many more. The unique combination of the state-of-the-art numerical modeling techniques with state-of-the-practice engineering applications makes the presented material relevant and valuable for engineering practice. We believe that it is beneficial to share the advances on this subject and promote some further development.