MULTIPHASE FLOW AND TRANSPORT PROCESSES IN THE SUBSURFACE pdf

1: UCI - Subsurface Processes Lab

One important precondition for modeling multiphase flow and transport processes in the hydrosystem "subsurface" is the general formulation of a model. The objective of this book is to present a consistent, easily accessible formulation of the fundamental phenomena and concepts, to give a uniform.

 Multiphase flow and transport processes in the subsurface environment are extremely important in a number of industrial and environmental applications at various spatial and temporal scales. Thus, it is necessary to identify, understand, and predict these processes to improve the production of conventional and unconventional oil and gas, to increase the safety of geological sequestration of carbon dioxide and nuclear waste disposal, and to make remediation of contaminated aquifers more effective. The past decades have seen remarkable growth in research related to multiphase flow and transport in porous and fracture media [1 â€” 4]. Numerical models have been widely used to understand, predict, and optimize complex physical fluid flow processes combined with chemical, thermal, mechanical, and biological interactions occurring between fluids and the reservoir rocks [5 â€” 7]. Nevertheless, theoretical and practical challenges remain considerable. First, advanced mathematical models are needed to robustly and efficiently analyze the vast variety and complexity of multiphase processes. Second, application of these models to actual field site remains challenging, specifically in areas that involved strongly coupled processes, such as compressed gas energy storage, energy recovery from geothermal reservoirs as well as from coalbed methane, and gas hydrate deposits. This special issue discusses some of the latest research outcomes in two parts: We received 24 submissions, 13 of which passed the initial assessment and review process. A brief summary of this issue is given in the following. For the theoretical fundamentals, we have the following: The study demonstrates that the distribution of waiting time in different dead-end pores having the similar power-law decline at early time and transiting to an exponential decline in the end. The anomalous dispersion is highly dependent on the sizes of immobile zones. The study demonstrates the importance of accounting for the complex thermodynamic behavior of CO2 as it travels along the injection well and interacts with the surrounding formation. Coupled wellbore-reservoir effects may strongly affect the conditions near the injection interval and thus the injectivity, salt-precipitation potential, and other factors determining the performance and sustainability of CO2 injection. For the field applications, we have the following: They quantified the relative contributions of free and adsorbed gas to the total production rate. Moreover, they discussed the roles that the matrix, natural fractures, and the stimulated reservoir volume play in the recovery of natural gas, which determines the accuracy with which each of these components needs to be characterized or controlled. The beneficial production interval scheme should consider the reservoir conditions with high permeability and high hydrate saturation. This developed system is further applied in 37 underground goafs in Dabaoshan mine, which provides an efficient guidance to both reduce the accident risk and improve the mining environment. Acknowledgments We are glad to share these papers with relevant communities of interest. We sincerely hope that the information, the methods, and the achievements presented in the above papers will improve the understanding of the complex multiphase flow and transport processes and solve some practical engineering problems. With the growing demands on environmentally sustainable energy production, we believe it is essential to continue improving our fundamental understanding of multiphase flow and transport processes and to advance our predictive simulation capabilities for solving challenging real-world problems. We would like to express our sincere gratitude to colleagues who performed candid and valuable reviews of the original manuscripts.

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2: CiteSeerX â€” Citation Query Multiphase Flow and Transport

One important precondition for modeling multiphase flow and transport processes in the hydrosystem "subsurface" is the general formulation of a model.

An autonomic reservoir framework for the stochastic optimization of well placement by Wolfgang Bangerth, Hector Klie, Mary F. Wheeler - Cluster Computing: The adequate location of wells in oil and environmental applications has a significant economic impact on reservoir management. However, the determination of optimal well locations is both challenging and computationally expensive. The overall goal of this research is to use the emerging G The overall goal of this research is to use the emerging Grid infrastructure to realize an autonomic self-optimizing reservoir framework. In this paper, we present a policy-driven peer-to-peer Grid middleware substrate to enable the use of the Simultaneous Perturbation Stochastic Approximation SPSA optimization algorithm, coupled with the Integrated Parallel Accurate Reservoir Simulator IPARS and an economic model to find the optimal solution for the well placement problem. Show Context Citation Context On optimization algorithms for the reservoir oil well placement problem by W. GEOSC , " Determining optimal locations and operation parameters for wells in oil and gas reservoirs has a potentially high economic impact. Finding these optima depends on a complex combination of geological, petrophysical, flow regimen, and economical parameters that are hard to grasp intuitively. On the other hand, automatic approaches have in the past been hampered by the overwhelming computational cost of running thousands of potential cases using reservoir simulator, given that each of these runs can take on the order of hours. Therefore, the key issue to such automatic optimization is the development of algorithms that find good solutions with a minimum number of function evaluations. In this work, we compare and analyze the efficiency, effectiveness, and reliability of several optimization algorithms for the well placement problem. None of these algorithms guarantees to find the optimal solution, but we show that both SPSA and VFSA are very efficient in finding nearly optimal solutions with a high probability. We illustrate this with a set of numerical experiments based on real data for single and multiple well placement problems. Wheeler - Concurrency and Computation: Practice and Experience 17 The emerging Grid infrastructure and its support for seamless and secure interactions is enabling a new generation of autonomic applications where the application components, Grid services, resources, and data interact as peers to manage, adapt and optimize themselves and the overall application. In this paper we describe the design, development and operation of a prototype of such an application that uses peer-to-peer interactions between distributed services and data on the Grid to enable the autonomic optimization of an oil reservoir. We apply the least-squares mixed finite element framework to the nonlinear elliptic problems arising in each time-step of an implicit Euler discretization for variably saturated flow. This approach allows the combination of standard piecewise linear H 1 -conforming finite elements for the hydrau This approach allows the combination of standard piecewise linear H 1 -conforming finite elements for the hydraulic potential with the H div -conforming Raviart-Thomas spaces for the flux. It also provides an a posteriori error estimator which may be used in an adaptive mesh refinement strategy. The resulting nonlinear algebraic least-squares problems are solved by an inexact Gauss-Newton method using a stopping criterion for the inner iteration which is based on the change of the linearized leastsquares functional relative to the nonlinear least-squares functional. The inner iteration is carried out using an adaptive multilevel method with a block Gauss-Seidel smoothing iteration. For a realistic water table recharge problem, the results of computational experiments are presented. Macro-scale dynamic effects in homogeneous and heterogeneous porous media by Sabine Manthey, S. Majid Hassanizadeh, Rainer Helmig - Transp. Porous Media , " It is known that the classical capillary pressure-saturation relationship may be deficient under non-equilibrium conditions when large saturation changes may occur. An extended relationship has been proposed in the literature which correlates the rate of change of saturation to the difference betwee An extended relationship has been proposed in the literature which correlates the rate of change of saturation to the difference between

the phase pressures and the equilibrium capillary pressure. In these simulations, it is assumed that the traditional equilibrium relationship between the water saturation and the difference in fluid pressures holds locally. A quasi-Newtonâ€”Rhapson algorithm solves the nonlinear system of equations. The linear system of equations Meyers type estimates for approximate solutions of nonlinear elliptic equations and their applications by Yalchin Efendiev, Alexander Pankov " In this paper we obtain Meyers type regularity estimates for ap-proximate solutions of nonlinear elliptic equations. These estimates are used in the analysis of a numerical scheme obtained from a numerical homogenization of nonlinear elliptic equations. Numerical homogenization of nonlinea Numerical homogenization of nonlinear elliptic equations results in discretization schemes that require additional integrability of the approximate solutions. The latter motivates our work. Meyers Show Context Citation Context The homogenization of 7 is studied in [13].

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Multiphase flow and transport processes in the subsurface environment are extremely important in a number of industrial and environmental applications at various spatial and temporal scales.

4: Rainer Helmig (Author of Multiphase Flow and Transport Processes in the Subsurface)

Rainer Helmig Multiphase Flow and Transport Processes in the Subsurface A Contribution to the Modeling of Hydrosystems With Figures Springer.

5: Advances in Multiphase Flow and Transport in the Subsurface Environment

One important precondition for modeling multiphase flow and transport processes in the hydrosystem "subsurface" is the general formulation of a model. The objective of this book is to present a consistent, easily accessible formulation of the fundamental phenomena and concepts, to give a uniform description of mathematical and numerical modeling, and to show the latest developments in the.

6: Multiphase Flow and Transport Processes â€“ Special Interest Group, UK Fluids Network

Multiphase flow and transport processes in the subsurface: a contribution to the modeling of hydrosystems. Author(s): Helmig, R. Author Affiliation: UniversitÃ¤t Stuttgart, Institut fÃºr Wasserbau, Pfaffenwaldring 61, D Stuttgart, Germany.

7: About â€“ Multiphase Flow and Transport Processes

The general formulation of a model is an important precondition for modeling multiphase flow and transport processes in subsurface hydrosystems. This book presents a consistent and easily.

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The Friday Miracle and Other Stories Editable bi-annual calendar Lavater, Mendelssohn, Lichtenberg, by E.J. Engel. The Oedipus tyrannus Hybrid wars on terrorism and for empire Becoming teammates Your opinion matters Discovering Scientific Method COMBINING BEADWEAVING STITCHES Strategy and the defense dilemma List of all constitutional amendments india Organizational flexibility for financial institutions Educational survey of Tattnall County, Georgia Full Color Take-Home Activities The seven elements of art The Golden Sentinels A disturbance in the farce V. 4. Semisolid products Toshiba 5520c service manual Wordperfect X for Windows 95 Instant Reference Motion mountain physics textbook Breaking dawn stephenie meyer ebook Hypermodern chess Where two worlds met Behavioral research in accounting Her best friend sarah mayberry Small arms ammunition at the International Exposition, Philadelphia, 1876. Handbook of food expenditures, prices and consumption Gangs as social actors by John M. Hagedorn The boy with a broken heart book Epilogue : falling down, reaching for the stars, and coping with feelings The new public service serving not steering 4th ed Ultimate npcs skulduggery The Chemical Synthesis of Natural Products Me Bandy, You Cissie (Bandy Papers (Bandy Papers) Musettas waltz sheet music Female sex perversion Bhavishya purana in bengali Calculus from Graphs, Numbers, Symbols (Calculus from Graphs, Numbers, Symbols) 17 Mel and Python.