Original Articles

The Alternating-Direction Schemes and Numerical Analysis for the Three-dimensional Seawater Intrusion Simulation

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摘要   Both numerical simulation and theoretical analysis of seawater intrusion in coastal regions are of great theoretical importance in environmental sciences. The mathematical model can be described as a coupled system of three dimensional nonlinear partial differential equations with initial-boundary value problems. In this paper, according to the actual conditions of molecular and three-dimensional characteristics of the problem, we construct the characteristic finite element alternating-direction schemes which can be divided into three continuous one-dimensional problems. By making use of tensor product algorithm, and priori estimation theory and techniques, the optimal order estimates in H~1 norm are derived for the error in the approximate solution.

关键词   three-dimensional   seawater intrusion

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