Mathematical Modeling of the Process of Drilling Mud Filtrate Penetration into the Reservoir

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The work is devoted to mathematical and numerical modeling of mud filtrate penetration processes when drilling wells in reservoirs containing oil. It is known that the distribution of saturation of pore space significantly affects the transformation of the field of the resistivity of the zone of penetration of the filtrate of the drilling mud. On the basis of two-dimensional self-similar solutions, the existence of a unique smooth solution close to the corresponding solution of the one-dimensional Stefan problem in self-similar variables is proved. The paper proposes an effective algorithm for the numerical solution of the problem under consideration. In modeling, the flow region is star-like relative to the center where the well is located, and the desired solution monotonically decreases along the radius of the well effect. Using special variables, the main problem is reduced to an equivalent boundary-value problem for a second-order nonlinear elliptic equation in a fixed domain. Further, with the help of a numerical solution, a comparative analysis is carried out.

Numerical Study of the Process of Expelling Carbonated Liquid from a Formation

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The paper investigates the motion of a carbonated liquid at the bottom of a well. A mathematical model of the motion of a carbonated liquid has been developed and numerical experiments have been carried out with the

Authors' Index