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Investigation of instability of displacement front in non-isothermal flow problems¹ NATALIA SYULYUKINA, Lomonosov Moscow State University, ANNA PERGAMENT, Keldysh Institute of Applied Mathematics, Russian Academy of Sciences — In this paper, we investigate the issues of front instability arising in non-isothermal flow displacement processes. The problem of two-phase flow of immiscible fluids, oil and water, is considered, including sources and dependence of viscosity on temperature. Three-dimensional problem with perturbation close to the injection well was considered to find the characteristic scale of the instability. As a result of numerical calculations, theoretical studies on the development of the instability due to the fact that the viscosity of the displacing fluid is less than the viscosity of the displaced have been confirmed. The influence of temperature on the evolution of the instability was considered. For this purpose, the dependence of oil viscosity on temperature has been added to the problem. Numerical calculations were carried out for different values of temperature and it was shown that with increasing of production rate. Thus, it has been demonstrated that the selection of the optimal temperature for injected fluids a possible way for stimulation of oil production also delaying the field water-flooding.

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