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A New Method for Dynamic Analysis and Predicting Production of Multi - Fractured Horizontal Tight/Shale Oil Wells

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Predicting production of tight/shale oil has been attracting people's discussion. In this paper, a new method for dynamic analysis and predicting production of multi-fractured horizontal tight/shale oil wells is provided. After horizontal well fracturing, the boundary-dominated flow is occurred in the fracture, transient linear in the pressure sweep area is assumed as a series of pseudo-steady states. The appropriate method for historical fitting is selected, and the objective function, inversion parameters, initial values ,adjustable ranges etc is determined. The L-BFGS-B algorithm is used to quickly obtain the specific values of the inversion parameters and complete the historical fitting. On this basis, the prediction of production is completed.

The production data of a well in Daqing oilfield, China is selected to validate this method. The historical fitting effect is very well, and the time is short. The result show that this method has the characteristics of fast calculation speed, high fitting precision and considering multiple inversion parameters.

The novel feature of this method is that the tight/shale oil production prediction model is established on the concept of dynamic sweep, which can realize the rapid prediction of reservoir reconstruction scale and estimated ultimate recovery(EUR). The result of this method can be mutually verified with the numerical simulation result. This paper provides a new method for dynamic analysis and predicting production of multi-fractured horizontal tight/shale oil wells for petroleum engineers.

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