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## Productivity forecast model of vertical hydraulic fracturing well with varying conductivity in tight oil reservoir

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Hydraulic fracture has become an essential well stimulation technique in tight oil reservoirs. Large-scale vertical well fracturing can generate longer vertically oriented fractures to increase drainage area and, therefore enhance production and recovery efficiency of single well while also save costs[1]. The aim of this study is to develop a more practical productivity forecast model that can take into account of the heterogeneity of fracture distribution. Firstly, the fracture geometry model is established based on the features of pseudo three-dimensional model (P3D)[2] and the aperture changes along the length of hydraulic fracture. The hydraulic fracture is then divided into N segments. For each segment, fracture permeability is calculated by analyzing porosity change caused by proppant embedment, deformation, crush and diagenesis under the influence of effective closure pressure[3]. Finally, the productivity forecast model of vertically fractured well is established to deal with practical situations where the aperture and permeability of fractures cannot be neglected. The heterogeneous fracture model shows a good precision in the proof-test, and proved to be more credible and practicable than homogeneous model. We then report the results of several numerical simulations conducted for different values of fracture length, effective closure pressure and permeability of each segment, as well as a comparison with the simulated results of fracture model with homogeneity properties.

### References

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