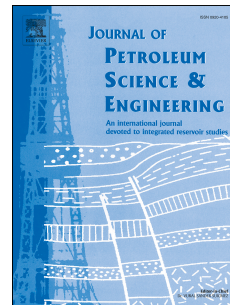


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Modeling vertical well in field-scale discrete fracture-matrix model using a practical pseudo inner-boundary model

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1 **Modeling Vertical Well in Field-Scale Discrete Fracture-Matrix**

2 **Model Using a Practical Pseudo Inner-Boundary Model**

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7 **Abstract**

8 The discrete fracture-matrix model (DFM) technique has contributed to the rapid
9 development of fracture modeling. In terms of vertical well modeling, however, the
10 current well models fail to handle the field-scale DFM utilization. In this study, a
11 pseudo inner-boundary model is presented tailored to this problem. Specifically, the
12 modeling methodology includes mesh generation and transmissibility evaluation.
13 Regarding the mesh generation, the model handles the 2-D triangular-gridded matrix
14 and 1-D edge-gridded fracture. The strict geometric analogy to generate triangles for
15 the wellbore is abandoned, instead, the wellbore is approximated by a source/sink
16 point and returns to a circular geometry when evaluating the transmissibility. The
17 treatment sheds the limitation of triangle size and proves to boost the generation
18 efficiency. Regarding the transmissibility evaluation, the derived formulations apply
19 the radial/linear approximation for flow in matrix/fracture well-gridblocks, and
20 various conditions are considered, including gridblock geometry (triangle and
21 rectangle), flow state (steady-state, unsteady-state and pseudosteady-state) and well
22 completion (fully penetrating well and partially penetrating well). In addition, the
23 compatibility with the star-delta transformation is discussed. By refining the
24 well-gridblock into several sub-triangles, the formulations could be rapidly
25 implemented to non-triangle-based DFM (e.g. PEBI, Cartesian). The model

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