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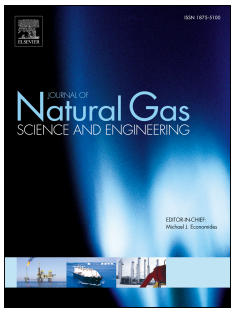

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Introducing Optimized Validated Meshing System for Wellbore Stability Analysis Using 3D Finite Element Method

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Keywords: finite element; wellbore stability; mesh optimization; drilling process; mud weight; rock failure

Abstract

Finite element method (FEM) as a powerful tool for studying stress and strain status is being extensively employed in geotechnical studies. As the initial and boundary conditions, element type, and meshing system heavily affect the accuracy and precision of the results obtained from FEM, in this research we present a novel approach which is optimized and validated by the results obtained from reality. At first a mechanical earth model (MEM) was constructed using different well logging data, results of core analysis, and drilling reports for one of the central Iranian carbonate reservoirs. Then, a depth range was selected in the pay zone of a vertical well for FEM simulation. The selected depth range consists of two different zones: the upper zone with normal faulting regime and the lower zone with strike-slip faulting regime.

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