Numerical modelling of three-dimensional fluid flow in a spiral compensator

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Abstract

The problem of the numerical modelling of the damping effect of the spiral compensators of percussion–rotary drilling devices is considered. The Roe first-order difference method has been adapted for the computation of a three-dimensional flow of a barotropic compressible fluid on a spatial curvilinear grid. As a result, the distributions of the solution components have been obtained both inside the compensator channel and at its upper outlet. A comparison of the damping effect of the compensator with the results of the one-dimensional computation by a TVD second-order scheme has shown that the three-dimensional computations produce a slightly more pronounced damping effect than the one-dimensional computations.
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1. Introduction

The percussion–rotary technique is currently the main technique for the drilling of wells in the sedimentary rocks for the exploratory purposes and oil and natural gas production. This technique is inefficient

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