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Title **Hydraulic Characterization of Fractured Reservoirs: Simulation on Discrete Fracture Models**
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Abstract

Advanced characterization methodology and software are now able to provide realistic pictures of fracture networks. However these pictures have to be validated against dynamic data like flowmeter, well test, interference test or production data and calibrated in terms of hydraulic properties. This calibration and validation step is based on the simulation of these dynamic tests. What has to be overcome is the possibility to both accurately represent large and complex fracture networks and simulate matrix-fracture exchanges with a minimum number of grid-blocks. This paper presents an efficient patented solution to tackle this problem. First, a method derived from the well-known dual-porosity concept is presented. The approach consists in developing an optimized explicit representation of the fractured medium and specific treatments of matrix-fracture exchanges and matrix-matrix flows. In this approach, matrix blocks of different volumes and shapes are associated to each fracture cell depending on the local geometry of the surrounding fractures. The matrix block geometry is determined using a rapid image processing algorithm. The great advantage of this approach is to simulate local matrix-fracture exchanges on large fractured medium in a much faster and appropriate way. Indeed, the simulation can be carried out using a much smaller number of cells compared to a fully explicit discretization of both matrix and fracture media. The proposed approach presents other advantages due to its great flexibility. Indeed, it accurately handles the cases where flows are not controlled by fractures alone: either the fracture network may be not hydraulically connected from one well to another, or the matrix may have a high permeability in some places. Finally, well test cases demonstrate the reliability of the method and its range of application.