High performance flow simulation in discrete fracture networks

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Abstract

Natural fractured media are highly unpredictable because of existing complex structures at the fracture and at the network levels. Fractures are by themselves heterogeneous objects of broadly-distributed sizes, shapes and orientations that are interconnected in large correlated networks. We generate stochastic discrete fracture networks and run numerical flow simulations, using a mixed finite element method. We achieve large scale simulations by using appropriate numerical libraries and parallel computing.