Modeling flow in fractured porous media with fractures as interfaces

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ABSTRACT: In this talk we are concerned with the numerical modeling of flow in porous media with fractures. We are interested in domains having fractures of known form and location and in models in where the interaction between the fracture and the matrix rock is taken into account. For this purpose we developed a numerical model where the fracture is an interface between the two sides of the matrix rock which it separates. We have considered fractures to be a porous medium themselves with either a larger permeability or a smaller permeability (case of a barrier). The fractures may also intersect.

We review the various porous media flow models that we have studied: Darcy, Forchheimer, two-phase. One important feature of the method is the possibility of using nonmatching grids for the fracture and the matrix and we present numerical results showing this property and accuracy results. Finally we present a project for calculating flow in 3-D domains containing fracture networks generated by geostatisticians.