

Adaptive fracture approximation

SABINE STICHEL

*Goethe-Center for Scientific Computing,
University of Frankfurt,
Germany*

`sabine.stichel@gcsc.uni-frankfurt.de`

joint work with D. LOGASHENKO, A. GRILLO, G. WITTUM

Numerical simulations of flow in fractured porous media follow two main approaches. The fractures are either represented by low-dimensional manifolds motivated by the anisotropic geometry or as three-dimensional objects resolving all physical phenomena taking place in the fractures. Results of the two approaches are compared for some benchmark problems and it can be observed that only for sufficiently small fracture widths the cheaper low-dimensional approach gives acceptable results. In this work a criterion based on fracture characteristics and flow parameters is introduced to indicate the validity of the low-dimensional approach. A dimension-adaptive method is presented that can represent the fractures either full- or low-dimensional depending on the value of this criterion. Using this approach the full resolution with corresponding cost is only used if necessary.