



Contribution ID: 788

Type: **Poster (+) Presentation**

A new discrete fracture model for fluid flow based on phase field method

Tuesday, 1 June 2021 10:00 (1 hour)

Fluid flow in fractured porous media is a common phenomenon in many engineering applications, and many numerical methods have been proposed to capture these processes. Here, a new discrete fracture model based on phase field method is presented. The common discrete fracture models represent fractures by sharp topology in an explicit way, regardless of using conforming or non-conforming mesh. Inspired by the definition of crack phase field, the sharp fracture topology is treated as a diffusive one in the solution of fluid flow problems, and the integration of fluid flow equation over fractures can be transformed to the one over the matrix. The algorithm to determine the fracture phase field and finite element discretization are described in detail. The performance of the proposed method is validated against the classic discrete fracture model on several numerical cases in both two and three dimensions. The convergency behavior of the proposed method is further investigated through sensitivity analysis to mesh resolution and fracture parameters. Numerical results demonstrate that the proposed method is accurate, convergent and quite promising for simulating fluid flow in fractured porous media.

Time Block Preference

Time Block A (09:00-12:00 CET)

References

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Session Classification: Poster +

Track Classification: (MS3) Flow, transport and mechanics in fractured porous media