

ACMS Applied Math Seminar

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Zoom Link:

<https://notredame.zoom.us/j/95432405707?pwd=REtHbXdqVmEzMXNfY1FIQ2REajYwUT09>

Meeting ID: 954 3240 5707
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Modeling and Optimization for Nonlinear Flows in Fractured Porous Media

In this study, we analyze the flow filtration process of slightly compressible fluids in fractured porous media. This problem is inspired by modern methodologies of oil/gas recovery that involves fracking which drastically increased the production in petroleum reservoirs. The modeling and simulation of the flow dynamics of fractured porous media is challenging as it is a multi-physics, multi-scale problem.

We model the coupled fractured porous media system, where the linear Darcy flow is considered in porous media and the nonlinear Forchheimer equation is used inside the fracture. Using methods in differential geometry, complicated geometric features of the fractures are included in the modeling. We then obtain a reduced fracture model and show that the solution of the reduced model is close to the solution of the actual flow in the fracture reservoir system. Moreover, we analyze the optimization problem: optimal length of the fracture that maximizes the productivity of the reservoir.

The Department of Applied and Computational
Mathematics and Statistics

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