Contribution ID: **528** Type: **Poster (+) Presentation**

Multiscale Model Reduction of Thermoporoelasticity Problems in Heterogeneous and Fractured Media Using Generalized Multiscale Finite Element Method

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

Thermoporoelasticity problem has many applications in science and engineering: geothermal energy systems, nuclear waste disposal, wellbore stability analysis, and others. However, most of the applied problems of thermoporoelasticity cannot be solved analytically. Therefore, it is essential to develop mathematical models and efficient numerical methods. The mathematical model is described by a coupled system of equations for pressure, temperature, and displacements. We consider heterogeneous and fractured media. We apply a multiscale model reduction to reduce the size of the discrete system. We use a continuous finite element method with a Discrete Fracture Model (DFM) for fine grid approximation. For coarse grid approximation, we apply the Generalized Multiscale Finite Element Method (GMsFEM). We present numerical results for two- and three-dimensional model problems in heterogeneous and fractured media. We compute errors between the multiscale solution with the fine-scale solution for different numbers of multiscale basis functions. The results demonstrate that the proposed method can provide good accuracy with a few degrees of freedom.

Time Block Preference

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

References

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