

LINEAR ALGEBRA PROBLEMS IN MODELLING OF POROUS MEDIA PROCESSES

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Abstract

An overview of linear algebra problems solved in modelling of physical phenomena in porous media is presented. The considered problems are porous media fluid flow, advection-dispersion transport, and interaction with solid matrix. Various numerical methods are used, primary and mixed-hybrid finite elements, finite volumes, and either explicit or implicit time discretisation.

Usually a linear algebraic equation system is to solve applying these methods. The systems are sparse and their structure depends on topology of the discretisation mesh. In all presented problems, the structure of the mesh is the same.

For the most of the presented models, there was constructed an efficient solver and the models are used in practice. We briefly discuss also a relation between accuracy of numerical approximation and computational cost for some numerical methods, which were not implemented yet.