

# Numerical simulation of the poroelasticity problems in heterogeneous porous media.

Vasilyeva M.V., Tyrylgin A.A.

## Abstract

In this work, we consider the poroelasticity problems in heterogeneous porous media. Mathematical model contains coupled system of the equations for pressure and displacements [1]. For displacement in porous media we consider elastic and viscoelastic models [2, 3]. The Computational algorithm is based on finite element approximation in space and an implicit difference scheme for time approximation [1, 4]. We perform a numerical comparison of the models for pressure and displacement for different values of the model parameter. The results are presented for two-dimensional and three-dimensional formulations.

## References

- [1] *Kolesov A. E., Vabishchevich P. N., Vasilyeva M. V.* Splitting schemes for poroelasticity and thermoelasticity problems // *Computers and Mathematics with Applications.* – 2014. – T. 67. – No. 12. – C. 2185-2198.
- [2] *Gaspar F. J. et al.* A stabilized method for a secondary consolidation Biot's model // *Numerical Methods for Partial Differential Equations.* - 2008. - T. 24. – No. 1. – C. 60-78.
- [3] *Mesquita A. D., Coda H. B.* Alternative Kelvin viscoelastic procedure for finite elements // *Applied Mathematical Modelling.*- 2002.- T. 26.- No. 4.- C. 501-516.
- [4] *Brown D. L., Vasilyeva M.* A generalized multiscale finite element method for poroelasticity problems I: linear problems // *Journal of Computational and Applied Mathematics.* – 2016. – T. 294. – C. 372-388.