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## Parallel 3-d simulations for porous media models in soil mechanics

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Christian Wieners, M. Ammann, Stefan Diebels, Wolfgang Ehlers

**Institutions:** Augsburg College, University of Stuttgart, Saarland University

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## Parallel 3-d simulations for porous media models in soil mechanics

C. Wieners

with W. Ehlers (Stuttgart), S. Diebels (Saarbrücken), M. Ammann (Stuttgart)

### Abstract:

We introduce a general parallel model for solving coupled nonlinear and time-dependent problems in soil mechanics. In particular, we discuss the application to a triphasic porous media model, where we compute the deformation of unsaturated soil together with the pore-fluid flow of water and air in the soil, and where the material behaviour of the skeleton is assumed to be elasto-viscoplastic. In two large-scale numerical experiments we finally present an extended evaluation of our parallel model for demanding 3-d configurations.

### References:

C. Wieners, W. Ehlers, S. Diebels, M. Ammann. Parallel 3-d simulations for porous media models in soil mechanics. *Comput. Mech.* 2002, 75-87.

C. Wieners, W. Ehlers, M. Ammann. Distributed Point Objects: A new concept for parallel finite elements applied to a geomechanical problem *Future Generation Computer Systems* (2005), in press

C. Wieners, M. Ammann, T. Graf, W. Ehlers. Parallel Krylov methods and the application to 3-d simulations of a triphasic porous media model in soil mechanics. to appear in *Comput. Mech.*