

# Time Integration of Hydro-Mechanical Model for Bentonites

Tomáš Koudelka, Tomáš Krejčí, Jaroslav Kruis

Faculty of Civil Engineering of Czech Technical University in Prague

tomas.koudelka@fsv.cvut.cz, krejci@fsv.cvut.cz, jaroslav.kruis@fsv.cvut.cz

## Abstract

Behaviour of expansive compacted soils depends significantly on its microstructure. Two distinct pore systems have to be taken into account. Recent advances in modelling of hydro-mechanical behaviour of unsaturated soils reveal crucial role of hydromechanical coupling. Volumetric deformation of soil skeleton influences the degree of saturation which in turn influences soil effective stress. A special model has been developed by Mašín[1] and Mašín&Khalili [2] who defined the model within the theory of hypoplasticity.

Our contribution deals with efficient numerical time integration of the constitutive model. The integration is based on Runge-Kutta method with adaptive step length where some modifications of the original model were proposed due to singularities revealed in the original model. The material model was implemented in the open source code SIFEL [3]. The implementation was used for benchmark tests and there is also comparison of the Runge-Kutta methods with different order applied to the integration of the constitutive equations.

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## References

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