INVITATION TO THE LECTURE

SEPTEMBER 19, 2023   12:30   CONFERENCE ROOM

THE ELASTIC THRESHOLD FOR SIZE-DEPENDENT PLASTICITY AND COMPARISON WITH EXPERIMENTS

LIMIT AND SHEAR STRENGTH REDUCTION ANALYSES IN GEOTECHNICAL STABILITY

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This seminar will consist of two short talks presented recently in the XVII International Conference on Computational Plasticity - COMPLAS, Barcelona and supported by an internal fond on mobility and excellence.

The first contribution is a joint work with Daya Reddy (Cape Town) and deals with a rate-independent strain-gradient plasticity model proposed just by Daya. A new methodology how to fit inelastic material parameters on basis of laboratory experiments is suggested. It is based on the determination of the elastic threshold. The lower and bound problems defining the threshold are introduced and related solution concepts are proposed. The methodology is tested on a torsion problem with copper micro-wires where appropriate experimental data are available.

The second contribution is a joint work with Franz Tschuchnigg (Graz), Eva Hrubešová and Zdeněk Michalec and is focused on the development of a rigorous variant of the shear strength reduction method (SSRM) enabling to determine factors of safety and failure zones within slope stability assessment. This research is motivated by the fact that current solvers on SSRM in well-known commercial codes may lead to spurious numerical oscillations, especially if the non-associated plastic flow rule is considered. To suppress this drawback, a modification of SSRM is suggested. Consequently, an optimization framework for the modified SSRM is derived and related reliable solution concept is developed. Such an approach is illustrated on numerical examples inspired by geotechnical practice.