# ELASTOPLASTIC CONSTITUTIVE FORMULATION FOR PARTIAL SATURATED SOILS

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In this work an elastoplastic constitutive formulation for partial saturated soils is presented. The proposed material model is based on an extension of the MRS Lade model whereby the suction and the total net stress are introduced as additional independent and dependent stress components, respectively. Consequently the cap and cone yield conditions of the MRS Lade model both in hardening and softening as well as the internal evolution laws in these regimes are redefined to include the dependency on the suction.

For the solution of the algorithmic problem related with the stress integration during finite strain increments the unconditionally consistent Backward Euler method is used. In this sense, the variational form of the yield rule is generalized to solve the energy minimization problem in the stress space defined by the three stress invariants plus the suction.

The predictive capability of the proposed constitutive model is analyzed for different stress paths and deformation histories and comparison with experimental results are included.

Finally, the elastoplastic constitutive equations are numerically analyzed with regards to the discontinuous bifurcation predictions which illustrate the significant influence of the suction both in the critical localization directions and in the failure mode of partial saturated soils.

**Key words**: elastoplasticity, partial saturated soils, suction, cone-cap, localization

**References**

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