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Modelling of Elastic-Plastic or Viscoplastic Materials Sensitive to the Type of Processes – Different Approaches

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Sensitivity to the type of the process is universal property well known in many practical cases. The presentation of this property is like different behavior of the nonelastic material during fore example: extension or compression; loading or unloading; hardening or softening; plastic deformation with athermal or thermofluctuational micromechanismes; relaxation or creep; etc. The principle of the modeling of this type of material behavior is based on the introducing models with different material constants according to the type of process in consideration. In this paper we will give two approaches: (1) First: It is more or less classical approach, using nonsymmetric yield surfaces in the stress space; (2) Second: It is on the base of extended strain space, introducing the process type indicators and incremental constitutive relations with different material functions for different process types. We present, like examples, some characteristic models with experimental verifications.

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