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A comparative study between micro- and macro-mechanical constitutive models developed for complex loading scenarios

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Abstract

Constitutive models developed for simulating plastic response upon strain path changes are combined: 1) a macro-mechanical model based on anisotropic yield function, associated flow rule and distortional hardening using Homogeneous Anisotropic Hardening (HAH) approach; 2) a micro-mechanical model using self-consistent crystal plasticity in conjunction with crystallographic dislocation-density based hardening. The micro-mechanical model is employed to probe the yield surface in order to gain the insight required to construct empirical rules appropriate for the macro-mechanical model.

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