INVESTIGATION ON THE DISTORTIONAL HARDENING/SOFTENING IN METALS, POLYMERS, BIOLOGICAL MATERIALS, AND OTHER MATERIALS

LI-WEI LIU[1], SLAVOMÍR PARMA[2]

[1] National Taiwan University
10617, Taipei, Taiwan
liweiliu@ntu.edu.tw

[2] Institute of Thermomechanics of the CAS
Dolejskova 1402/5, 182 00 Prague, Czech Republic
parma@it.cas.cz

ABSTRACT

The understanding of the mechanical behavior of a material under the operational environment has long been an important issue for the design and safety assessment. In recent years, particular attention has been given to research with applications to multiaxial cyclic loading. Under the multiaxial cyclic loading, the yield surface of the material translates, expands, and distorts. Towards the accurate prediction of yield surface evolution, several new plasticity models have been proposed and studied in recent years [1, 2].

Current work suggests, combining the kinematic, the isotropic, and the distortional hardening rules would a crucial point. However, this development greatly increases demands on computing power and require careful examination of numerical convergence. Furthermore, dedicated optimizations of numerical implementation are crucial for computational efficiency of mixed hardening predictions, numerical verification, and calibration.

This MS provides a platform for researchers to exchange his/her work which is especially related to but not limited to the investigation on the distortional hardening/softening in metals, polymers, biological materials, and other materials. The computational investigation includes not only the continuum-based but also the particle-based approach whereas the computational modelling contains single-scale as well as multi-scale simulations. Theoretical research and experimental study are all welcome.

REFERENCES (maximum 2 references)

[1] Reyne B., Barlat F., *A new concept for continuum distortional plasticity*, International Journal of Plasticity, Vol. 155, 103303, 2022.

[2] Choi, H., Yoon, J.W., *A new simplified distortional hardening model for nonlinear strain paths*, International Journal of Plasticity, Vol. 165, 103617, 2023.