Visco-Plastic Chaboche model for nickel-based alloys under anisothermal cyclic loading

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The mechanical behavior of visco-plastic materials such as nickel-based alloys is highly dependent on temperature. Some characteristics such as viscosity, hardening, static recovery, dynamic recovery have more or less influence on the overall behavior depending on the temperature range. The unified constitutive model developed by Chaboche [1] is efficient in representing this complexity as it is very flexible and contains many features. The basic initial Chaboche model contains a viscosity law and one or several hardening equations. Within these hardening equations, new extensions allow adding several features to represent the complex behavior of the studied material.

The aim of this study is to understand the role of the functions and parameters present within an advanced Chaboche model adapted to cyclic anisothermal loading developed in [2]. Within the new implementation of this model currently ongoing within Lagamine code [3] developed in MSM team, features as uniaxial behavior, anisothermal modeling, kinematic hardening due to anisotropic dynamic recovery, relaxation, parameter identification are analyzed. Experimental data are available by literature survey [4], [5] and ongoing project Solar Perform.

References

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