

# MULTI-SCALE MODELLING OF HETEROGENEOUS STRUCTURES WITH INELASTIC CONSTITUTIVE BEHAVIOR

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**Summary.** *In this work we consider a strongly coupled multi-scale problem in the context of inelastic structural mechanics. We assume that a finite ratio of scales exists such that we can replace the more standard phenomenological and analytical homogenization approaches by a lower level numerical description of the micro-structural behavior. More specifically, we use continuum damage and plasticity based finite element method (FEM) models to describe the matrix-inclusion type of micro-structure (e.g., for a porous or hard inclusion composite). The micro-scale FEM model is then coupled to the macro-scale FEM model through a localized Lagrange multiplier approach. This multi-scale strategy is very well adapted to a parallel computing algorithm using a component template library. The efficiency of the implementation is shown on large scale numerical examples (see [1], [2]).*

## REFERENCES

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