

Workshop Matherials

October 12th, 2020 – 11:30 am

Pierre SUQUET (Laboratoire de Mécanique et d'Acoustique, Marseille -- Académie des Sciences)

Model-Reduction in nonlinear Micromechanics of Materials

Abstract:

(Joint work with J.C. Michel) A common practice in structural problems involving heterogeneous materials with well separated scales, is to use homogenized, or effective, constitutive relations. In linear elasticity the structure of the homogenized constitutive relations is strictly preserved in the change of scales. The linear effective properties can be computed once for all by solving a finite number of unit-cell problems.

Unfortunately there is no exact scale-decoupling in multiscale nonlinear problems which would allow one to solve only a few unit-cell problems and then use them subsequently at a larger scale. Computational approaches developed to investigate the response of representative volume elements along specific loading paths, do not provide constitutive relations. Most of the huge body of information generated in the course of these costly computations is often lost.

Model reduction techniques may be used to exploit the information generated along such computations and, at the same time, to account for the commonly observed patterning of the local plastic strain field. A model (called NTFA for Nonuniform Transformation Field Analysis) will be developed and illustrated in this talk, with the aim of preserving the underlying variational structure of the constitutive relations, while using approximations which are common in nonlinear homogenization.

Join Zoom Meeting

<https://univ-grenoble-alpes-fr.zoom.us/j/93328340754?pwd=bXF6NzY0VHcyQks0QkxiWkFWRjJqUT09>

Meeting ID: 933 2834 0754

Passcode: 143388

One tap mobile

+33170379729,,93328340754# France

+33170950103,,93328340754# France

Dial by your location

+33 1 7037 9729 France

+33 1 7095 0103 France

+33 1 7095 0350 France