

COMPUTATIONAL APPROACHES FOR HETEROGENEOUS MATERIALS

FREDERIC LEGOLL^{*} AND JAN ZEMAN[†]

^{*} Ecole Nationale des Ponts et Chaussées
6 et 8 avenue Blaise Pascal, Cité Descartes, 77455 Marne la Vallée, France
frederic.legoll@enpc.fr

[†] Department of Mechanics, Czech Technical University in Prague
Thákurova 7, 166 29 Prague 6, Czech Republic
Jan.Zeman@cvut.cz

ABSTRACT

Computational approaches dedicated to heterogeneous materials (and multiscale problems in mechanics in general) have recently witnessed very significant developments. Models may be deterministic or include some probabilistic features in order to capture increasingly complex phenomena. The purpose of this invited session is to review the recent advances in these two directions, and at the intersection of those. Our aim is to gather scientists from different communities working on these topics, in order to foster interdisciplinary exchanges, in particular concerning the methodological developments of these approaches.

Topics to be addressed within this session include (but are not limited to):

- numerical homogenization approaches
- multiscale computational approaches (including HMM, FE², MsFEM and LOD methods)
- the use of model order reduction methods (including reduced basis, POD and PGD techniques), in particular in the context of multiscale problems
- approaches concurrently coupling models at different scales
- weakly-invasive approaches
- data-driven and machine-learning based approaches