

EINLADUNG

zum Gastvortrag

von

Prof. Adnan Ibrahimbegovic

Ecole Normale Supérieure – Cachan, LMT-Cachan, France

am

Mittwoch, 21.10.2009, 14.00 (c.t.) Uhr

Technische Universität Wien, Karlsplatz 13, 1040 Wien
HS 12, (Hof 2, Stiege 6, 2. Stock)

Computational Mechanics of Concrete and Reinforced Concrete Structures: From Material Heterogeneities to Structural Failure with Size Effect

Adnan Ibrahimbegovic^{1*}

¹Ecole Normale Supérieure - Cachan, LMT-Cachan
61 avenue du president Wilson, 94235 Cachan, France
ai@lmt.ens-cachan.fr

Abstract: In this work we address several issues pertaining to efficiency of the computational approach geared towards modeling of inelastic behavior of concrete as a heterogeneous materials with microstructure, which is represented by a multiscale model. We elaborate upon both cases, where two-scale computation can be uncoupled and where the scales remain coupled throughout the computations, implying a constant communication between the finite element models employed at each scale.

We also discuss different manners of representing a complex multi-phase microstructure within the framework of the finite element model constructed at that scale, selecting a model problem of two-phase material where each phase has potentially different inelastic behavior. We conclude presentation with considerations of microstructure optimization problems. Both computational aspects for coupled nonlinear mechanics-optimization problem and the optimal choice of design variables are addressed.

The uncertainty aspects are finally takes into account pertaining to the incomplete information on the material heterogeneities. The latter is presented as an alternative strategy for bridging the scales, which allows to replace the phenomenological model with random fields for parameters.