

Micro-Macro Analysis of Shape Memory Alloy Composites

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In the last decade, great interest was stimulated by the idea of developing Shape Memory Alloy (SMA) composites, obtained by embedding SMA wires, filaments, short fibers, particulates or thin films into different types of matrices. The aim is to produce smart composites by a suitable distribution of SMA within the matrix material and to control the thermo-mechanical behavior of SMA through heating and cooling.

The lecture will focus on a micro-macro approach to the analysis of the mechanical behavior of composites obtained by embedding long fibers of Shape Memory Alloys into an elastic matrix.

The overall constitutive response of SMA composites is determined through two homogenization techniques: one is based on the self-consistent method while the other on the analysis of a periodic composite. The overall response of SMA composites is strongly influenced by the pseudo-elastic and shape memory effects occurring in the SMA material.

Finally, the overall constitutive laws of the SMA composite obtained by the proposed homogenization procedures are implemented at the Gauss points of a three-dimensional finite element, which can be used in simulations of the macromechanical response of structural parts made of SMA composites.

Přednáška v angličtině se koná ve čtvrtek 12.5.2005 ve velké zasedací síni děkana (místnost B 169) v budově Stavební fakulty ČVUT v Praze, Thákurova 7, Dejvice.

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