



Technische  
Universität  
Braunschweig

Graduiertenkolleg 2075

Modelle für die Beschreibung der Zustandsänderung  
bei Alterung von Baustoffen

## Vortrag im Gästeprogramm des GRK 2075

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## Mathematical modeling of shape memory alloys

Mittwoch, 21.06.2017, 13.15 Uhr  
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We discuss the existence of an energetic solution to a quasistatic evolutionary model of shape memory alloys. Elastic behavior of each material phase/variant is described by polyconvex energy density. Additionally, to every phase boundary, there is an interface-polyconvex energy assigned. The model considers internal variables describing the evolving spatial arrangement of the material phases and a deformation mapping with its first-order gradients. It allows for injectivity and orientation-preservation of deformations. Moreover, the resulting material microstructures have finite length scales. Computational examples by Jan Valdmán will be shown.

Education: 1993 RNDr. (= MS.) in mathematical modeling, Faculty of Mathematics and Physics, Charles University, Prague; 1997 Ph.D. in mathematical modeling, Faculty of Mathematics and Physics, Charles University, Prague; 2006 habilitation in mathematics, Technical University, Munich, Germany; 2007 Privat-Dozent in mathematics, Technical University, Munich, Germany; 2014 habilitation in mathematics-mathematical analysis, Charles University, Prague, Czech Rep. Positions: A senior research fellow in Institute of Information Theory and Automation, CAS (the head of the Department of Decision-Making Theory since 2005) and Dpt. of Physics, Faculty of Civil Engineering, Czech Technical University, Prague (since 2006, now associate professor). Regular supervision of Bc., MSc., and Ph.D. students.

Awards: Giovanni-Prodi Lehrstuhl, University of Würzburg, summer semester 2015–2016, Visiting professorship, University of Würzburg, November 2014, 2003 Otto Wichterle Award, 2002 Josef Hl'ávka Prize, 1996 Fellowship of the J.W. Fulbright commission.

Main keywords: Nonlinear PDEs and systems, Evolution equations, Variational techniques,  $\Gamma$ -convergence and relaxation, Approximation and discretization, Mathematical modeling of materials, Materials science.

Editorial board: Kybernetika, Guest editor of Discrete and Continuous Dynamical Systems-S.

Membership in professional organization: Member of the Executive committee of the International Society for the Interaction between Mechanics and Mathematics.

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