



Research Center MATHEON Mathematics for Key Technologies

MATHEON Multiscale Seminar*

organised by R. Klein (FU), K. Schmidt (TU), and B. Wagner (TU)

TU Berlin, MA 415, **Monday, July 7th 2014**, 9.15 am

Sergiy Nesenenko (University of Duisburg-Essen, 9.15 am)

Homogenization in elasto-plasticity via a phase-shift technique

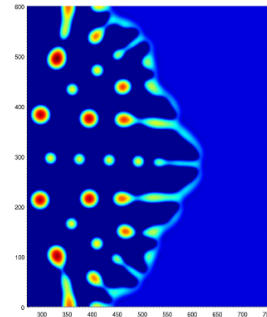
The goal of this talk is to present a homogenization method based on a phase-shift technique for the quasistatic initial-boundary value problem with internal variables modelling an inelastic solid body at small strain. We start our exposition from the formal derivation of the homogenized equations using the standard two-scale asymptotic ansatz. After discussing the difficulties arising in the justification of the homogenized model derived by the asymptotic ansatz, we present the shift-phase method and show that the solutions of the microscopic problem converges towards the solutions of the homogenized problem in an averaged sense over phase shifts of the microstructure. Based on this result we construct an asymptotic solution, which converges to the solution of the microscopic problem in the L^2 -norm, thus avoiding the averaging.

— Coffee break —

Barbara Wagner (TU Berlin/WIAS, 10.35 am)

Unsteady non-uniform base states and their stability

In this talk we consider several pattern forming systems, ranging from phase separation of polymer blends, self-assembly of crystalline films to dewetting of polymer films. These systems all have unsteady non-uniform base states. We develop asymptotic techniques to analyse their associated linear stability problems and derive expressions for predicting the dominant wave-length of the pattern.



* The MATHEON Multiscale Seminar takes place approximately three times per term with one or two talks about recent work on partial differential equations with multiple scales. Please contact one of the organisers if you want to be invited by e-mail or if you would like to contribute a talk.