



Master-Thesis

Homogenization, Multiscale-Material Modeling

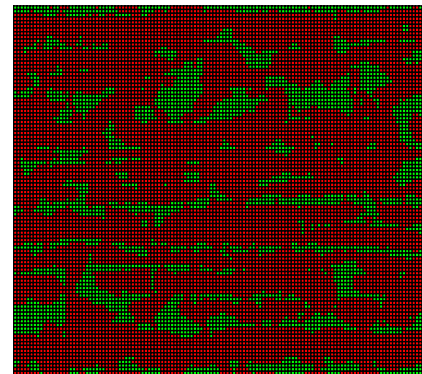
## Automated Randomized Generation of Optimized Microstructures with Applications to FEM<sup>2</sup>-Computations

### Goal:

In order to obtain “smaller” statistically similar microstructures, computer tools are to be developed.

### Project Description:

In many applications, e.g. the numerical simulation of hightech-steel, direct incorporation of microstructural information is necessary in order to avoid a large number of experiments. A method herefore is the direct micro-/macro-transition approach, where at each Gausspoint of the Macrostructure a microstructural boundary value problem is solved. Due to the high request of memory and computer speed this microstructural problem should be as small as possible, thus, tools for obtaining optimized microstructures is the main task in this thesis.



### Procedure:

- literature research,
- familiarization of herself/himself with MATLAB and FEAP,
- Development of numerical tools and interpretation of the results,
- scientific documentation in LaTeX.

### Prerequisites:

- tensor calculus, continuum mechanics and finite element method,
- Fortran77, C and LaTeX.

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**Status:** to be assigned

