



Master thesis project

Many materials exhibit fibrous microstructures at sufficiently small length scales and can be classified as fibre-embedded composites. Examples are soft biological tissues like skeletal muscles or tendons. Effective properties (strain energies) are obtained using suitable homogenisation methods for composites with anisotropic phases. In this project, numerical homogenisation frameworks shall be formulated and used to compare them with existing analytical schemes.

Tasks:

- Implement numerical homogenisation routines in a Finite-Element framework
- Generate different geometries that represent fibrous microstructures
- Perform simulation studies and comparisons with analytical schemes

Requirements:

- Knowledge of continuum mechanics
- Basic programming skills (Python)
- Motivation to dive into homogenisation theory and geometry (mesh) generation

Language:

English or German

Contact:

Christian Bleiler
christian.bleiler@imsb.uni-stuttgart.de

Homogenised response of fibrous composites with anisotropic phases

