Seminar im Rahmen des GRK 2078

Referent: Dipl.-Math. Felix Ospald  
Numerische Mathematik, Fakultät für Mathematik, TU Chemnitz

Uhrzeit: 15:45-17:15 Uhr  
Ort: 10.81, HS 62 (R 153)

Titel: Modeling and Numerical Simulation of Injection Molding for Short Fiber-Reinforced Thermoplastics

Abstract

In this talk we will present our experience, how to use and extend OpenFOAM's compressible and incompressible two-phase solver for the simulation of injection molding with short fiber reinforced thermoplastics in a laminar flow regime [1]. Second order fiber orientation tensors are computed using the Folgar-Tucker equation (FTE) with exact tensor closure and will be compared to a number of closure approximations. The FTE is coupled to the anisotropic viscosity-term of the Navier-Stokes equations for the non-Newtonian flow in a segregated manner. Phase dependent boundary conditions were implemented to simulate wall heat transfer, stickiness of the melt to the wall and to prevent air-traps close to the wall. Fiber orientations are compared to analytical results for a stationary 2d-channel flow. We also show that OpenFOAM performs simulations for real-world parts efficiently and we discuss its scaling capabilities. Some common issues regarding the evaluation of experimental data (such as viscosity measurements and CT-scans) in means of parameter identification [2] will be covered. Finally we will also give some hints about concentration modeling and associated issues in the semi-concentrated to concentrated regime. The talk closes with some remarks on open problems.

References:


Alle Interessenten sind herzlich eingeladen.

Prof. Dr.-Ing. Thomas Böhlke