

Bachelor / Master Thesis or Semester Project

Electro-thermo-mechanical finite element simulation of thermophysical testing equipment

Background

The Chair of Materials Engineering of Additive Manufacturing uses a Gleeble 3800-GTC for the physical simulation of thermal cycles, high-temperature testing, the characterization of phase transformations and more. The machine features resistance heating, which is why the temperature distribution in the sample and the heating/cooling rate highly depend on sample geometry, material, clamping and environment.

Aim

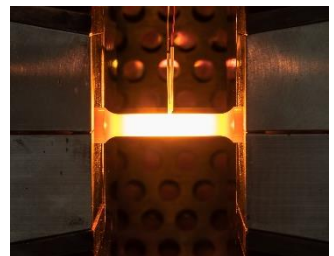
In order to optimize temperature distribution and heating/cooling rate while reducing preliminary experiments, the system should be simulated using the finite element (FE) method, covering electrical, thermal and mechanical quantities. The findings can be applied to current research work, e.g. with multi-material samples.

Tasks

- Literature study on similar applications
- Setup of coupled electro-thermo-mechanical simulations in Abaqus or similar
- Implementation of temperature control system in analogy to real setup
- Experimental validation on selected use cases and sensitivity studies
- Tasks will be adapted to type of thesis / project

Your profile

- Experience with FE software
- Interest in FE simulations & materials testing
- Self-reliance, reliability, thoroughness



Contact

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