

Masterarbeit / Master Thesis

CFD Simulations of Solid-Liquid Phase Change in Oscillating 2D Cavities

Heat transfer phenomena frequently appear in nature as well as in industrial processes. Particularly in applications such as cast of metals and alloys and in the crystal growth process. The work is mainly focused on the characterization of flow structure and deformation of the solid-liquid interface in a cavity with an oscillatory motion for low-moderate Rayleigh numbers via CFD simulations. The onset of the natural convection and its impact on the melting rate will be numerically investigated using the commercial software **Star-CCM+**.

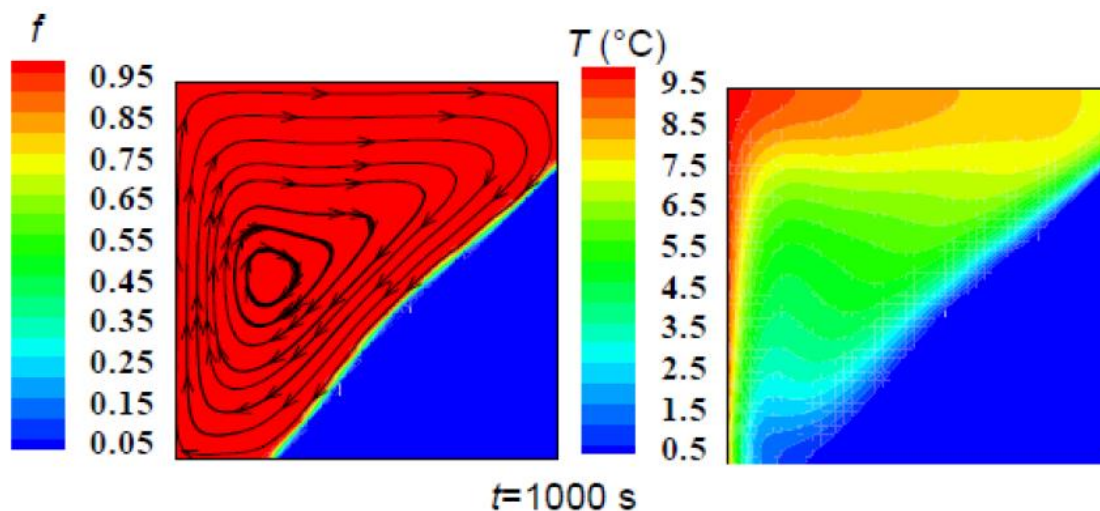


Figure 1: Streamlines and volume fraction of liquid

Figure 2: Isotherms during the phase-change proces in a 2D cavity

Tasks:

- Benchmark with experimental results from literature (solver validation)
- Setting simulation solver and boundary conditions
- Simulation of melting process in 2D cavities, varying characteristic parameters.
- Characterization of flow field, temperature distribution.
- Determination of criticality of the onset of natural convection.

Your profile:

You study preferentially **CBI, CEN, MB** or **CE** and you cover some of the following aspects:

- You know about **Fluid mechanics** and **Thermodynamics**
- You already worked with **Computational Fluid Dynamics**
- You are able to **work independently** with your **own initiative**
- You are **motivated**

Starting: Immediately!!!!

Supervision:

Dr.-Ing. Anuhar Osorio Nesme

✉ anuhar.nesme@fau.de

Room: 1.261, ☎ 09131 / 85-29475

Lehrstuhl für Strömungsmechanik

Cauerstraße 4, 91058 Erlangen