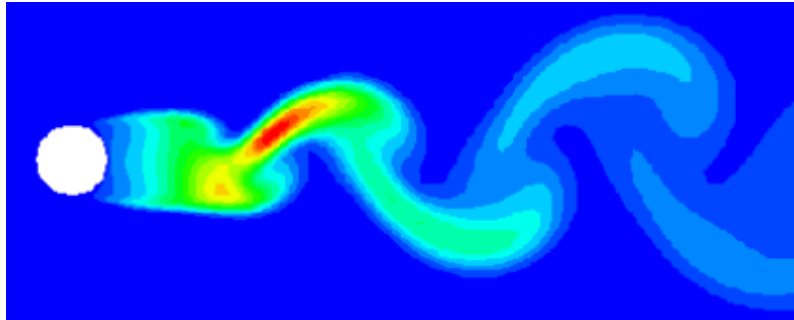


Lecture Announcement Winter Term 26/27

Turbulence Modelling



Snapshot of a turbulent wake behind a circular object. Simulation with a cubic Low-Reynolds-Number $k - \epsilon$ model.

After completing the course, students understand recent turbulence models that are implemented in common CFD software. They have expanded their competences in critical and cross-disciplinary thinking and are able to assess established methods with regard to accuracy, stability and effort. They have acquired detailed methodological competences and, on this basis, can develop solutions to new problems.

Contents:

- Review of fluid dynamical and numerical fundamentals
- Overview of turbulence theory
- Introduction to Direct Numerical and Large Eddy Simulation
- Detailed presentation of statistical turbulence models (eddy viscosity and Reynolds stress models)
- Hybrid models: Scale Adaptive (SAS) and Detached Eddy (DES) Simulation
- Wall treatment
- Laminar–turbulent transition
- Model extensions for stagnation flow, rotation and compressibility

Literature/Teaching Materials: Lectures and exercises are held in English. Lecture notes are available also in German. In addition, the entire module will be made available in German as a video stream via Moodle. Further literature will be recommended during the lecture.

Prerequisites for Attending: Fundamentals of Fluid Mechanics (Grundlagen der Strömungsmechanik), Advanced Fluid Mechanics (Fortgeschrittene Strömungsmechanik), ideally also Computer Simulation of Fluid Flow (Computersimulation von Fluidströmungen)

Dates: Lecture: Tuesday, 16:15 – 17:45, IC03/112
Exercise: Thursday, 08:15 – 09:45, IC03/112
Revision course: on demand or towards the end of the semester

Start of Lectures : Tuesday, 13th October 2026, 16:15, IC03/112

Exam Date and Format: To be announced, oral exam in English or optionally in German