

Introduction to MESHFREE

Virtual course for beginners

<https://www.meshfree.eu/en/events.html>



Simulate with complex geometries and complex physics

Course content

Lectures for all participants and practical exercises in small groups alternate. The following topics will be elaborated.

- Overview of MESHFREE (Who is behind it? Why no mesh? What can it do? How to access it?)
- Theory of MESHFREE (geometrical and mathematical modeling)
- Workflow of MESHFREE (preparation of surface mesh of geometry, setup of input files, execution of simulation, analysis of simulation results, trouble-shooting)
- Training setup: single-phase flow in a pipe
 - Exercise I - read-in of geometry including scaling, geometry alias for no-slip wall
 - Exercise II - geometry aliases for inflow and outflow, solver parameters and time control
 - Exercise III - general saving parameters and save items
 - Exercise IV - equations and curves, point cloud definition and alias variables
 - Exercise V - spherical point cloud refinement, radial point cloud refinement
 - Exercise VI - "open" outflow, half-filled pipe, free inflow
 - Exercise VII - movement of inflow
- Computational steering in MESHFREE (communication with running simulation)
- Material modeling in MESHFREE (surface tension, porous basis material, sophisticated equation of state, sophisticated viscosity, elastoplastic behavior, viscoelastic behavior)

Technical prerequisites

- Participants need a PC or laptop with (integrated) webcam as well as microphone and loudspeakers (a headset would be optimal).
- MESHFREE as well as ParaView have to be installed on the participants' PC or laptop in a Linux-based system (real or virtual machine).
MESHFREE is currently compiled on Red Hat Enterprise Linux 7. It has been successfully tested on the following operating systems: Red Hat Enterprise Linux 7, Ubuntu 20.04 LTS, Debian stable (version 10).

Video conference tool

We will use MS Teams as means of communication. For this, we will create a team solely for this course that participants will be added to by mail address. Specific topics and questions can be discussed in separate channels if needed.

Course language

English

Course instructor

MESHFREE team (Fraunhofer ITWM)

Course duration

Two days of training and optional third day of supported self-study, each from 9:00 to 16:30.

All times in UTC+2:00 from last Sunday in March to last Sunday in October, UTC+1:00 from last Sunday in October to last Sunday in March.

Registration

Participation is limited. Please register bindingly via mail to support@meshfree.eu up to two weeks before the course date.

Please note that export control must be carried out for non-German participants/organizations.

Course fees

None

Keep up to date on the planning of future courses without obligation via the following mailing list:
<https://listserv.itwm.fraunhofer.de/mailman/listinfo/meshfree-training-interest>