Schedule of the course

Computational Fluid Dynamics with Open-Source software OpenFoam

Mo 13.10	Tue 14.10 9^{30} - 14^{00}	Wed 15.10	Thu 16.10 9^{30} - 14^{00}	Fri 17.10

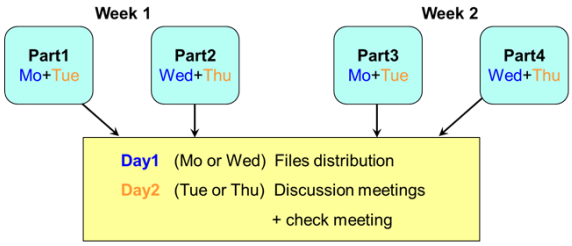
Opening meeting
 	
Introduction, what is OpenFoam, Linux commands
 	
Overview of OpenFOAM
Documentation, code structure, directory organization of a case (fundamentals of case structure)
 	
Finite volume method
 	
First OpenFOAM exercise
Lid-driven cavity
(setting a case, boundary and initial conditions, solver and control parameters)
 	
Check list for cavity
(what we learnt!)
	Zoom Meeting for questions and discussion	**Introduction to 3D laminar flow in a circular pipe**
		
		Meshing tools:
		○ **blockMesh + m4-script**
		Mesh generation with parameters
		○ **Snappy Hex Mesh**
		(SHM)
		
		Exercises
		• 3D flow in a circular pipe
		  • Study of various BCs
		  • Post-processing
		• Generation of geometry and mesh (pipe) with m4 parametrization
		• Example for SHM
		
		Check lists
		(what we learnt!)
			Zoom Meeting for questions and discussion	**Open issues/ questions can be sent per email**

Part1		Part2		
Day1-P1	Day2-P1	Day1-P2	Day2-P2	

Mo 20.10	Tue 21.10 9^{30} - 14^{00}	Wed 22.10	Thu 23.10 9^{30} - 14^{00}	Fri 24.10
Meshing tools: ○ Adaptive mesh refinement (AMR) ○ External tools and conversion to OF format **Kármán vortex street** (theory) **functionObjects** (e.g. time averaging, calculation of forces) **Exercises** Kármán vortex street (transient flow) ○ Structured mesh (blockMesh) ○ AMR → Comparison of results with two grid generation methods **Check list for Kármán vortex street** (what we learnt!)	**Zoom Meeting for questions and discussion**	**Programming** • Implementing the temperature equation in a solver • Implementing a new time-dependent boundary condition **Exercises** Application of new BC and solver with T-equation **Turbulent flow** (theory and exercises) **Summary & Best practice guidelines**	**Zoom Meeting for questions and discussion** **Closing meeting**	
Part3		Part4		
Day1-P3	Day2-P3	Day1-P4	Day2-P4	

Organisation

- Each part is organized as follows:
  - **Day1 (Monday and Wednesday)**
    - Files for the course are provided:
      1. Lectures (videos, *.mp4)
      2. Slides of lectures (pdf)
      3. Exercises (pdf)



    - No common meeting is foreseen (send email if you need support!)
  - **Day2 (Tuesday and Thursday)**: 9:30am – 2pm, discussion with teachers via Zoom meeting (Link, Meeting ID, Passcode will be send per email)

Use the one-to-one discussion on Day2!
Enter the meeting **whenever** you have an issue or a question!

➔ If you have problems on Day1 of each part send an email to chiara.mistrangelo@kit.edu or biao.lyu@kit.edu