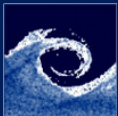


# Laboratory tasks I.

Simple  
problems

Balogh  
Miklós

- 1 Write and run a script to perform the simulation of lid-driven cavity including
  - Mesh generation
  - Simulation (in controlDict set endTime to 1)
  - Redirecting the output to a logfile
  - Plotting the time consumption of analysis steps
- 2 Visualize the results using paraFoam
  - Velocity map with vectors
  - Streamlines colored by the velocity
  - Mesh



## Laboratory tasks II.

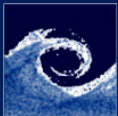
Simple  
problems

Balogh  
Miklós

- ③ Modify the cavityGrade case and run (via bash script)
- Modify constant/polyMesh/blockMeshDict (to have a fine, graded mesh)
  - Modify system/controlDict (according to the CFL)
  - Create the mesh
  - Map the fields from the simple cavity case
  - Run the simulation

```
41 blocks
42 (
43     hex (0 1 4 3 9 10 13 12) (40 40 1) simpleGrading (4 4 1)
44     hex (1 2 5 4 10 11 14 13) (40 40 1) simpleGrading (0.25 4 1)
45     hex (3 4 7 6 12 13 16 15) (40 40 1) simpleGrading (4 0.25 1)
46     hex (4 5 8 7 13 14 17 16) (40 40 1) simpleGrading (0.25 0.25 1)
47 );
```

```
28 deltaT          0.0005;
29
30 writeControl     timeStep;
31
32 writeInterval    200;
```

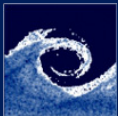


# Assignments

Simple  
problems

Balogh  
Miklós

- 1 How many finite volume cells are used in the performed simulation?
- 2 How many time-step is done for the cavityGraded case?
- 3 What is the mean and maximum Courant number for the cases in the last time-step?
- 4 How many iteration step was required when solving pEqn in the first and the last time-step?
- 5 How does the Courant number change, if the resolution is doubled and the time-step is halved?
- 6 What is the smallest cell size in case of the graded mesh?



# Homework

Simple  
problems

Balogh  
Miklós

- 1 Visualize the results of cavityGraded case
  - Velocity map with vectors
  - Streamlines colored by the velocity
  - Mesh
- 2 Run the cavityClipped case (via bash script, further info: [here](#))
- 3 Compare the results to the basic cavity case

## Listing 1: Open multiple cases with paraFoam

```
# Open a case (e.g. cavity)
cd $FOAM_RUN/tutorials/incompressible/icoFoam/cavity
paraFoam &

# Open another case (e.g. cavityClipped)
# Create a file in the case directory can be handled by paraFoam
touch ../cavityClipped/cavityClipped.OpenFOAM

# Open it with paraFoam (Open item of the File menu)
```