

Literature and Tools



EuroCC workshop

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Literature



There are two main web pages with links to literature:

- ▶ openfoam.org (on PC workstations)
- ▶ cfd.direct (on HPC systems)

User guides:

- ▶ User Guide #1
- ▶ User Guide #2
- ▶ Programming Guide – Learn c++ code!

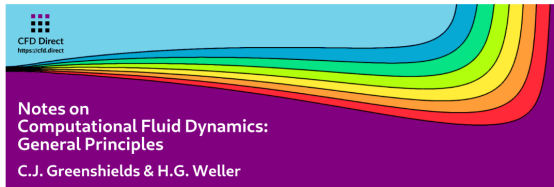
My GitHub repository:

- ▶ [OpenFOAM_School@github](https://github.com/OpenFOAM_School)

[Link to my GoogleDrive location with books for OpenFOAM](#)



[link to the book](#)



About the Book

Notes on Computational Fluid Dynamics (CFD) was written for people who use CFD in their work, research or study, providing essential *knowledge* to perform CFD analysis with confidence. It offers a modern perspective on CFD with the finite volume method, as implemented in OpenFOAM and other popular general-purpose CFD software. Fluid dynamics, turbulence modelling and boundary conditions are presented alongside the numerical methods and algorithms in a series of short, digestible topics, or *notes*, that contain complete, concise and relevant information. The book benefits from the experience of the authors: Henry Weller, core developer of OpenFOAM since writing its first lines in 1989; and, Chris Greenshields, who has delivered over 650 days of CFD training with OpenFOAM.

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1 Introduction
2 Fluid Dynamics
3 Numerical Method
4 Boundary Conditions
5 Algorithms and Solvers
6 Introduction to Turbulence
7 Reynolds-Averaged Turbulence Modelling
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ISBN 978-1-3999-2078-0, 291 pages.

[link to the book](#)

Tools



To be able to run advanced GMSH examples we need to set up Python environment

```
1 1. load module python:
2   $> ml av python (check target version)
3   $> ml python-version
4
5 2. Create new env:
6   $> python3 -m venv local
7
8 3. Activate new env:
9   $> source local/bin/activate
10
11 4. Install new packages (active env local):
12   $(local)> pip install numpy scipy sympy matplotlib
13   $(local)> pip install --upgrade gms
```



To use Python environment we need only to load it

```
1 1. load module python:
2   $> ml av python (check target version)
3   $> ml python-version
4
5 2. Activate new env:
6   $> source local/bin/activate
```



To use OpenFOAM environment we need to load

1 List available modules:

2 \$> module avail openfoam

3 \$> ml av openfoam (equivalent with upper command)

4

5 Load specific module:

6 \$> module load gnuplot/5.0.5-foss-2016b

7 \$> ml gnuplot/5.0.5-foss-2016b (equivalent with upper command)

8

9 For OpenFOAM to be running on HPC@ULFS we need to load this modules:

10 \$> ml openfoam-2112-gcc-11.2.0-lhrpyq4

11 \$> ml qt-5.15.3-gcc-8.5.0-scmeit7 (graphics libs for gnuplot)

12 \$> ml gnuplot/5.0.5-foss-2016b (for foamMonitor application)

13

14 and load you Python env with

15 \$> **source** work/Python/local/bin/activate (or **path** where your local
Python is)



Add the following part at the end in `system/controlDict`

```
1 functions
2 {
3     #includeFunc residuals
4 }
```

Create residual dictionary file `system/residuals` and include

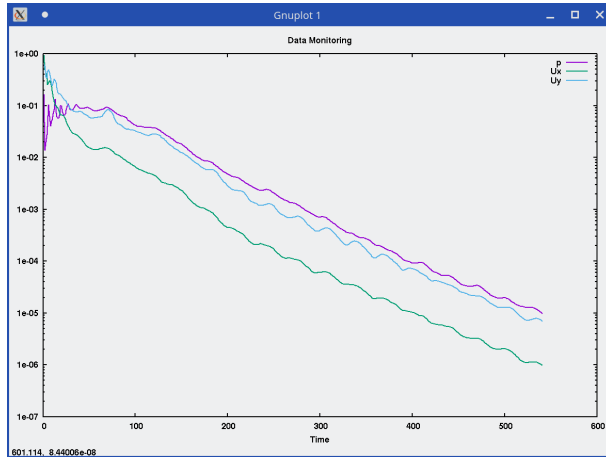
```
1 #includeEtc "caseDicts/postProcessing/numerical/solverInfo.cfg"
2
3 fields (p U);
```

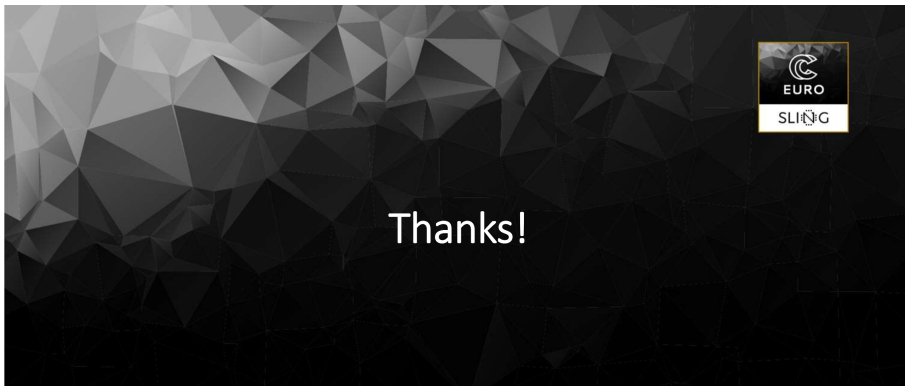
Run monitor command

```
1 foamMonitor -l -r 1 postProcessing/residuals/0/solverInfo.dat
```



```
1 foamMonitor -l -r 1 postProcessing/residuals/0/solverInfo.dat
```





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