Lund University
Department of Energy Sciences
Division of Fluid Mechanics

Group Study VI

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Your task is to, with emphasis on turbulence modelling, study and analyse the. You should work in groups of 2-3. You do not need to consider any numerical effects, however, the task requires that you do simulations with at least two turbulence models. The simulation geometry and mesh will be provided. A written report (6-12pages, 11pt Times New Roman, 1 inch margins) should be handed in by email (johan.revstedt@energy.lth.se) **latest 16 December 8.00**. You should also be prepared to orally present a short summary (max. 10 min.) on 18 December. Each group will also get the report of another group before 5 pm on 16 December and should review that report and prepare a few (at least three) questions for the seminar on 18 December. The review report is due on 20 December. After the seminar you will get feed-back on the preliminary report. This is to be used to prepare the final report, which should be handed in latest 17 January 2020.

The report shall contain:

- An abstract, briefly answering: What has been done? Why was it done? How was it done? What were the results?
- An introduction including the purpose of the study and a description of the fluid mechanical aspects of the problem.
- A methods section, where you should describe your assumptions, motivate your choice of models and describe the models.
- The computational set-up, describing your geometry, mesh, and boundary conditions.
- Presentation of your simulation results
- Your conclusions also including a brief discussion on the accuracy of your simulations.

In the oral presentation you should focus on describing the problem and the results of your simulations

Contact your advisor for a first meeting latest 3 December

Constricted pipes may be used in industrial applications for measuring volume flows, e.g. orifice meters. By measuring the pressure difference between the upstream pipe and the smallest flow area (*vena contracta*) one may calculate the volume flow. Normally the position of the pressure measurement points are determined from empirical methods. However, it would be of interest to investigate if the optimal position of the downstream measurement point varies with constriction ratio and Reynolds number.