Energy Technology Center
Luleå University of Technology

CFD with OpenSource software, assignment 3

Comments to reviwers of:

Tutorial dieselFoam by Per Carlsson

Author:
Per Carlsson per.carlsson@etcpitea.se

February 17, 2009

Reviewer Naixian Lu

1.2.4 Chemistry What does the therm.dat file specify?
The `therm.dat` *file is now described in greater detail in section 1.2.4 Chemistry.*

1.5 Adding a second liquid In order to add a second liquid, is it really necessary to make a new solver? My guess is the author made a user-defined solver for the later stage to implement a new evaporation model. If it's the case maybe at this stage it is better not to bring it up?
The reviwer is correct and the solver is now copied and modified in section 1.6 instead.

Reviewer Håkan Nilsson

Editorial
Spelling and gramar has been changed according to the reviwer's suggestions.
File names and directories font have been changed to `Verbatim`.

1.2.2 Boundary and initial conditions

The injectors are not discussed in greater detail but I have an idea how they they differ from each other. For the `unitInjector` the nozzle outlet velocity is calculated according to equation 1. For the `commonRailInjector` there is no C_d listed, and the nozzle outlet velocity is instead calculated according to equation 2 from the `injectionPressureProfile` and `injectionPressure`

$$v_{unitInjector} = \frac{\dot{m}}{C_d \rho_{fuel} A} \tag{1}$$

$$v_{commonRailInjector} = \left(\frac{\dot{m}}{\rho_{fuel} A} \right) \frac{P_{injectionPressureProfile} P_{injectionPressure}}{P_{injectionPressure}} \tag{2}$$

Equation 2 can thus be written as,

$$v_{commonRailInjector} = \left(\frac{\dot{m}}{\rho_{fuel} A} \right) P_{injectionPressureProfile} \tag{3}$$

- The `massFlowRateProfile` is described in greater detail.

1.2.2 Boundary and initial conditions, table 1.1

`subCycles` and `includeOscillation` are included. Have a suspicion that `interpolationSchemes` is the Euler-Lagrange coupling but is not sure so I did not include it.

The general thought with this tutorial from my part was to give an introduction to sprays and reacting flows but especially get the case running. To not loose focus from that, the sub models are not discussed or described in detail. I reasoned that those who are interested would find the information for them selves since most of the sub models have names that can be find in the literature.

1.2.3 Physical properties

- The `thermophysicalProperties` file is discussed in greater detail.

1.2.4 Chemistry

- Some minor clarifications are done.
- Chemical kinetics, thermodynamics and the combustion model are described.

1.6 Your own evaporation model

- Rewritten according to reviewers suggestions