CFD with OpenSource software

A course at Chalmers University of Technology
Taught by Håkan Nilsson

Study questions and answers for:

Description of interCondensatingEvaporatingFoam and implementation of SGS term into volume fraction equation

Developed for OpenFOAM-v2112

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Study questions

1. How does the phase interface be tracked in volume of fluid method?

   Answer: The phase interface is represented by the fraction of liquid volume in each cell. If the liquid volume fraction in the cell equals to 0, the cell is filled with gas. If the liquid volume fraction in the cell equals to 0, the cell is filled with liquid. If the liquid volume fraction is somewhere in between, the cell is filled with the combation of both.

2. What is the assumption of the Lee's phase change model?

   Answer: Lee's phase change model assumes that the mass is transferred at constant pressure and quasi-thermo-equilibrium state.

3. Why is the mass transfer rate $\dot{m}$ decomposed into $\dot{m}_v$ and $\dot{m}_c$

   Answer: since the phase change between liquid and gas is condensation and evaporation. When the temperature is smaller than the saturated temperature, condensation happens. When the temperature is bigger than the saturated temperature, evaporation happens.

4. How do you implement source terms into the volume fraction equation in interFoam?

   Answer: The first step could be create a H file and put the source term and the definition of the revelent varibles into the file. Then, include the H file before the volume fraction equation. The last step is plus this term in the right hand side of the volume fraction equation.