CFD WITH OPENSOURCE SOFTWARE

A COURSE AT CHALMERS UNIVERSITY OF TECHNOLOGY
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Study questions and answers for:

Implementing the pimpleFoam to oscillating flow solver porousOsciPimpleFoam using volume-averaged kOmega turbulence model

Developed for OpenFOAM-2.2.2
Requires: wave2Foam

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Study questions and answers

1. How the wave2Foam toolbox will be used, including volume-averaged theory, the way to use porous elements and porous flow equations in the new oscillating flow solver?
   Answer:
   The introduction of wave2Foam can be found in 'https://openfoamwiki.net/index.php/Contrib/waves2Foam'. The volume-averaged theory and porous flow equation has been introduced in Chapter 2. The new solver refers to porousWaveFoam solver in wave2Foam, which use the volume-averaged theory and porous flow equations. The porous elements are included in the new solver with the using of porosityZone library in wave2Foam. See the details in Chapter 5.

2. How the volume-averaged theory and porous elements are used in volume-averaged kOmega model?
   Answer:
   Similar to the new oscillating flow solver, the porous elements are considered in the volume-averaged kOmega model with the using of porosityZone library. The detailed implementation of that can be found in Chapter 6.

3. How oscillating flow can be achieved.
   Answer:
   The oscillating flow is simulated with bodyforce.

4. What is the difference between standard kOmega model and volume-averaged kOmega model?
   Answer:
   The volume-averaging process induces an additional term, and the effect of porosity is included in the new control equations.

5. How to consider model parameters in volume-averaged turbulence model?
   Answer:
   Similar to standard turbulence model, the model parameters are considered in the new turbulence model.