Natural Convection in an Enclosure Heated From Bottom

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Abstract

A fluid (air) filled in an enclosure having dimension 1m x 1m x 3mm, a vertical wall at x=0 and at x = L is subjected to ambient atmospheric temperature of 295K, bottom face is at constant temperature of 305K, while fluid initial temperature is taken as 300K. Top face is insulated/adiabatic. To simulate the 2-dimesional case front and back faces are taken as "empty" type. In Open FOAM v-7, "buoyantBoussinesqPimpleFoam" solver is merged with "buoyantPimpleFoam", although Boussinesq approximation can be applied easily by using the same solver.i.e. buoyantPimpleFoam. It is transient solver deals with natural as well as forced convection for compressible & incompressible fluid flow. k-Epsilon- turbulence model is used to solve the above-stated problem.

Geometry & Meshing: Geometry and meshing are done by using utilities offered by OpenFOAM named as blockMesh.

length = 1m

height = 1m

width = 3mm