Numerical study of natural convection in double chapels agricultural greenhouse

Slatni Yassine*1, Djezzar Mahfoud*2, BenderradjiRazik*3
* Université Frères Mentouri Constantine 1 Route Aïn El Bey 25000
Constantine Algérie
1,2 Laboratoire Physique Energétique (LPE)
3Laboratoire des énergies renouvelables et de développement durable (LERDD)
1slatniyacine@gmail.com, 2mdjezzar@umc.edu.dz

Abstract
In this investigation, we studied the numerical phenomena of the natural laminar and permanent convection in greenhouse with double chapels. The greenhouse is filled by a Newtonian and incompressible fluid. The number of Prandtl is fixed at 0.702 (case of the air), the approximation of Boussinesq was obeyed in the buoyancy force. The mass conservation equations of momentum and energy were solved numerically with the commercial code *Fluent*. The boundary conditions of our problem are: hot bottom wall with temperature TH, and the roof is cold with TC, the other walls are adiabatic. We examined the effect of Rayleigh number on the natural convection phenomena in the greenhouse. Finally, the simulation results are shown as stream function lines and temperature fields.

Keywords: Natural convection, agricultural greenhouse, finite volume method.