INVESTIGATION OF FORCED CONVECTION HEAT TRANSFER FROM A BLOCK LOCATED STAGGERED CAVITY WITH PARELLEL AND ANTI PARELLEL WALL MOTION

ABSTRACT

The work reported in this paper is deals about the steady state laminar flow and heat transfer of a lid driven staggered cavity with the heated block. Based on the aspect ratio (**AR= H/L= 0.5, H/L=1, H/L=2)** three different block shapes are introduced for numerical experiments it is considered at the geometric center of the cavity is taken as a solid walled block with no slip and stationary wall condition. The simulations are taken for Reynolds number *Re*=50, 100, 200, 300, 500 and 1000 and the heat flux of the block is 300K. A clock-wise momentum is convey to the fluid, by the two driving lids on the top and bottom side of the cavity, lids are set into an antiparallel wall motion. The upper lid moves to the right, while the lower one to the left, both with the same speed. The results are found to be good agreement with existing published results. It was found that the dynamics and the structure of the primary vortex and the corner vortices were strongly affected by the Reynolds number. It is observed that the overall drag coefficient decreases with increasing Reynolds number, Whereas the value of Average Nusselt number increases with increase in the Reynolds number for all the values of different blocks are studied. It is believed that this problem has the potential to become as popular as the other benchmark problems, like the lid driven cavity, backward facing step (BSF), flow over a circular cylinder, etc**.**