

## **Abstract**

A numerical study is performed in order to investigate the effects of the inlet flow structure on the flow and heat transfer characteristics in the reattachment zones over open cavity. Indeed, two inlet flow configurations are tested; a turbulent wall jet which has a particular structure with two sources of turbulence production (the first is due to the shear flow associated to the inner layer characterized by small scale and second one is of the free shear jet flow with large turbulence scales) and a free boundary layer flow. The inner region of these two flows is similar, but their external regions are extremely different. The separating and reattaching flow phenomena are of particular interest in engineering fields. The numerical results of the analyses the local convective heat transfer. The Nusselt number is more important and decreases immediately downstream the reattachment under the wall jet inlet flow. This detail may be explained from a dynamical point of view; the turbulent energy is more important but in small area around the each reattachment zone. The local Nusselt number increases when the Reynolds numbers augments. The evolution of local Nusselt, depends on incoming flow configuration. For the two configuration of incoming flow (Boundary layer or Wall jet), the distribution of mean Nusselt number is correlated according with some problem parameters. © 2015 The Japan Society of Mechanical Engineers