## Abstract

Laminar forced convection heat transfer and fluid flow of micro-scale backward-facing step (MBFS) with different types of longitudinal vortex generators (VGs) is numerical analyzed. The governing equations are discretized by finite volume method. Four basic types of VG which are rectangular and triangular wings and winglets pairs are attached to an unheated upper wall behind the stepped wall in order to enhance the thermal performance of MBFS. Three inclination angles of VGs are considered namely; 30°, 45°, and 60° with a wide range of water flow rate. The thermal and hydraulic performance of MBFS with VG is evaluated by JF factor in order not to show the enhancement in the heat transfer only, but the increase in the pressure drop as well. The results showed that the use of VG in MBFS increases the heat transfer and pressure drop simultaneously. The best heat transfer enhancement with a little increase in the pressure drop is observed in the case of rectangular wing VG at an attack angle of 60° and Reynolds number of 180 whereas (NuVG/Nuo) = 1.221. JF factor increases with Reynolds number until 180 and then a steep decrease has been monitored.