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# NUMERICAL INVESTIGATION OF WAVY MICROCHANNELS WITH RECTANGULAR CROSS SECTION

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## ABSTRACT

Computational results are presented that describe thermo-hydrodynamic behaviour of wavy microchannels of various geometric configurations. The configurations have been obtained by changing the geometric parameters such as relative waviness and aspect ratio for a constant hydraulic diameter of 400 μm. A 3D, steady, laminar conjugate model is developed and validated against available experimental data. Fluid flow and heat transfer characteristics have been studied for distinct configurations and is found that the thermo-hydrodynamic behaviour of fluid flow strongly depends on relative waviness and aspect ratio. The increased heat transfer and pressure drop are due to the occurrence of vortices that develop within the channel. Variation of local Nusselt number has been analysed and found to follow similar trend for different aspect ratios. A performance parameter known as channel effectiveness, has been used to analyse the combined effect of heat transfer and pressure drop. It is found that there is an optimum relative waviness for wavy channels which gives maximum performance especially for channels with low aspect ratios.