

## عنوان مقاله:

Calculation of Friction Coefficient and Analysis of Fluid Flow in a Stepped Micro-Channel for Wide Range of Knudsen Number Using Lattice Boltzmann (MRT) Method

## محل انتشار:

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## نویسندگان:

Y. Bakhshan - Mechanical Engineering Department, University of Hormozgan, Bandar Abbas, I.R. Iran

A. R. Omidvar - Mechanical Engineering Department, University of Hormozgan, Bandar Abbas, I.R. Iran

## خلاصه مقاله:

Micro scale gas flows has attracted significant research interest in the last two decades. In this research, the fluid flow of gases in the stepped micro-channel at a wide range of Knudsen number has been analyzed with using the Lattice Boltzmann (MRT) method. In the model, a modified second-order slip boundary condition and a Bosanquet-type effective viscosity are used to consider the velocity slip at the boundaries and to cover the slip and transition regimes of flow and to gain an accurate simulation of rarefied gases. It includes the slip and transition regimes of flow. The flow specifications such as pressure loss, velocity profile, streamline and friction coefficient at different conditions have been presented. The results show good agreement with available experimental data. The calculation shows that the friction coefficient decreases with increasing the Knudsen number and stepping the micro-channel has an inverse effect on the friction coefficient. Furthermore, a new correlation is suggested for calculation of the friction coefficient in ((the stepped micro-channel as below:  $C_f Re = 3.113 + 2.915/(1 + 2 Kn) + 0.641 \exp(3.203/(1 + 2 Kn$

## کلمات کلیدی:

Friction Coefficient, Gas Flow, Knudsen Number, Lattice Boltzmann, Micro-channel

## لینک ثابت مقاله در پایگاه سیویلیکا:

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