عنوان مقاله:

Flow Bifurcation Phenomena of Shear-Thinning and Newtonian Fluids in a Rectangular Channel in Presence of Intermediate Steps: using Carreau-Yasuda Model

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خلاصه مقاله:

Flow bifurcation transitions of shear-thinning fluid and Newtonian fluid, flow through a two-dimensional rectangular channel in presence of intermediate steps have been considered in this manuscript. Employing SIMPLE algorithm, the governing equations have been solved numerically and using FLUENT software to visualize the simulation results for convenience. The Rheological properties of shear-thinning and Newtonian fluids are described in the light of Carreau-Yasuda model. The result of this formulation has been validated with those of an earlier work. The motivation of this work is to study the bifurcation characteristics for different values of Reynolds numbers in presence of multiple steps in a rectangular channel. Pressure drop characteristic has also been studied for different values of expansion ratio and intermediate steps. For some particular value of expansion ratio (ER), a linear relation between Re_crit and the value of n of Carreau-Yasuda model has been shown.

کلمات کلیدی:

Flow bifurcation, Rectangular channel, Carreau, Shear, thinning fluid, Newtonian fluid, Yasuda model