Uncertainty Quantification for the Flow of Nanofluids in Converging/Diverging Channels

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Abstract

In mathematical models, parameters are one of the most important input factors that affect the model outputs. In this work, the effects of parameters in complement with their interactions effects on output variables of nanofluids in both converging and diverging channels has been studied. The mathematical model is solved numerically by using Matlab built-in solver bvp4c. Global sensitivity analysis (Sobol's method) is used to quantify the effects of input parameters and their interactions on model outputs. The results showed that the channel opening ( ) is the most influencial parameter for the velocity profile, while Eckert number (Ec) becomes the most influencial parameter for temperature distribution in both diverging and converging channels. Also, the least sensitive parameters, as well as interaction effects of involved parameters are identified on velocity and temperature profiles in both converging and diverging channels.

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