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NUMERICAL ANALYSIS OF PULSATING FORCED CONVECTION IN A BACKWARD-FACING STEP FLOW SUBJECTED TO NANOFLUIDS

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Abstract

The numerical investigation of pulsating forced convection in a backward-facing step flow using water-based nanofluids has been presented. This study is performed for different Reynolds numbers (based on the step height) in the range of 10 and 200, different inlet velocity and different Strouhal number. The effects of water-based nanofluids, which contain Al_2O_3 (Aluminium oxide) and Cu (Copper) nanoparticles with volume fractions ranging from 1% to 5%, on the heat transfer were determined. All numerical solutions were evaluated by using the Finite Volume Method of Computational Fluid Dynamics. The effects of related parameters as Reynolds number and pulsating frequency on the fluid flow and heat transfer characteristics have been numerically analyzed. Increasing the Cu nanoparticle volume ratio gets the heat transfer better than of all.

Key words: backward-facing step flow, forced convection, nanofluids, pulsating flow

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