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Forced convection of pulsating nanofluid flow over a backward facing step with various particle shapes
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Abstract
In this study, numerical analysis of forced convective pulsating nanofluid flow over a backward-facing step with different nanoparticle shapes was performed by the finite volume method. The effects of the Strouhal number (between 0.1 and 2), solid nanoparticle volume fraction (between 0 and 0.04) and nanoparticle shapes (spherical, blade and cylindrical) on the heat transfer and fluid flow were examined with the aid of numerical simulation. It was observed that the average Nusselt number is a decreasing function of the Strouhal number for the considered range, and it enhances for higher solid particle fractions. Using nanofluids with spherical particles is advantageous in pulsating flow, whereas cylindrically-shaped particles are preferred in steady flow configurations. Average Nusselt number enhancements up to 30.24% and 27.95% are achieved with cylindrical- and spherical-shaped particles at the highest volume fraction. © 2018 by the authors.

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