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Magnetohydrodynamic nanofluid natural convection in a cavity under thermal radiation and shape factor of nanoparticles impacts: A numerical study using CVFEM

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Abstract
In this study, the natural convection of a magnetohydrodynamic nanofluid in an enclosure under the effects of thermal radiation and the shape factor of nanoparticles was analyzed numerically using the control-volume-based finite element method (CVFEM). Columns, spheres, and lamina are examples of the nanoparticle shapes used in the investigation. The study of nanofluid flow and heat transfer was accomplished with an extensive range of nanofluid volume fractions, radiation parameters, Hartmann numbers, Rayleigh numbers, and nanoparticle shape factors. Also, the correlation between the average Nusselt number and the influencing parameters of the current study was determined. The findings demonstrate that laminar nanoparticles have a more notable impact on the average and local Nusselt numbers than the other nanoparticle shapes. © 2018 by the authors.

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