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**Impacts of magnetic field and non-homogeneous nanofluid model on convective heat transfer and entropy generation in a cavity with heated trapezoidal body**

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**Abstract**
A numerical study is made on the entropy generation and magnetohydrodynamics natural convection of Al 2 O 3 -water non-homogeneous nanofluid inside a square enclosure equipped with a heated trapezoidal body. The Galerkin weighted residual finite element method is applied to solve the dimensionless governing equations within the utilized computational domain along with the algorithm of Newton–Raphson iteration that is used for simplifying the nonlinear terms in the equations. The characteristics of fluid flow fields, temperature distributions and entropy generation are studied for an enormous range of the Rayleigh number (10 3 ≤ Ra≤ 10 6 ) , volume fraction of nanoparticles (0 ≤ ϕ≤ 0.04), Hartmann number (0 ≤ Ha≤ 50) , thermal conductivity of the trapezoidal solid body (k w = 0.5 , 0.76, 1.95, 7 and 16) and the height of the trapezoidal solid body (0.15 ≤ D≤ 0.45). It is shown that the streamlines pattern is more sensitive to the increase in the Hartmann number in comparison with the augmentation of the volume fraction of nanoparticles. Also, for a more thermodynamically optimized system, the higher Hartmann number at a higher solid volume fraction of nanofluid is recommended as they show less entropy generation. © 2019, Akadémiai Kiadó, Budapest, Hungary.

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