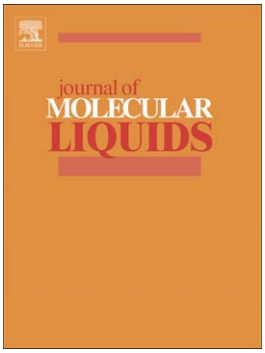

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Magnetic field influence on nanofluid thermal radiation in a cavity with tilted elliptic inner cylinder

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Abstract

In this attempt, influence of Lorentz forces on Fe_3O_4–water nanofluid is presented. Radiation source term is taken in to account in energy equation. Newly suggested model is imposed for viscosity of ferrofluid. Control Volume based Finite Element Method is selected to simulate this article. Graphs have been portrayed in order to explain the roles of Radiation parameter (Rd), inclination angle (ξ), Fe_3O_4 -water volume fraction (ϕ), Hartmann (Ha) and Rayleigh (Ra) numbers. Obtained findings indicate that Nusselt number enhances with augment of inclination angle. Rate of heat transfer augments with enhance of buoyancy forces, radiation parameter but it reduces with rise of Lorentz forces.

***Keywords*:** Magnetic field; MFD viscosity; Nanofluid; Radiation; elliptic cylinder; Inclination angle; Natural convection.

Nomenclature

B	Magnetic induction	α	Thermal diffusivity [m^2/s]
A	Amplitude	ζ	Rotation angle
N	Number of undulations	$\Omega \& \Psi$	dimensionless vorticity & stream function
Rd	Radiation parameter	β	Thermal expansion coefficient [1/K]
Ra	Rayleigh number	ρ	Fluid density [kg/m^3]
T	Fluid temperature	σ	Electrical conductivity
Nu	Nusselt number	μ	Dynamic viscosity [Pa.s]

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