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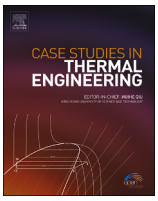

Controlling convective heat transfer of shear thinning fluid in a triangular enclosure with different obstacle positions

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ABSTRACT

The free convection of a non-Newtonian fluid in an equilateral triangular cavity containing a triangle obstruction in various positions is investigated numerically in this paper. The research is carried out using the finite element method. The sloped side walls are adiabatic, while the bottom is kept heated. At the obstacle, three positions are examined. The effects of different power law indexes on free convection have been investigated. The temperature field, fluid flow, and heat transfer are all highly influenced by the obstacle's location, Rayleigh number, and power law index. The resulting outcomes are confirmed using existing results in the literature and verified using a grid sensitivity analysis. A comparison of the current results to those found in the literature demonstrates the study's dependability and trustworthiness.

Nomenclature

B	cold obstacle location	ϵ_{ij}	strain rate $= 1/2(\partial u_i/\partial x_j + \partial u_j/\partial x_i)$
g	gravitational acceleration	η	apparent viscosity
H	dimensionless cavity slant length	θ	Dimensionless Temperature
I	second invariant of the strain tensor rate	ρ	density
k	thermal conductivity	υ	Poisson's ratio
m	Power-law consistency index	β	thermal expansion coefficient
P	Dimensionless pressure	τ	extra stress tensor
n, **n**	power- Law index, unit vector	ψ	stream function
Nu	local Nusselt number	***Subscripts***	
p	pressure	av	Average

(*continued on next page*)

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