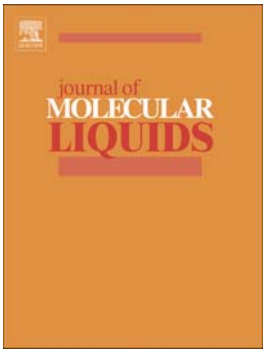

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PII: S0167-7322(16)32612-5
DOI: doi: 10.1016/j.molliq.2016.11.021
Reference: MOLLIQ 6564

To appear in: *Journal of Molecular Liquids*

Received date: 6 September 2016
Accepted date: 11 November 2016

Please cite this article as: Naveed Ahmed, Umar Khan, Syed Tauseef Mohyud-Din, Influence of nonlinear thermal radiation on the viscous flow through a deformable asymmetric Porous Channel: A numerical study, *Journal of Molecular Liquids* (2016), doi: 10.1016/j.molliq.2016.11.021

Influence of Nonlinear Thermal Radiation on the viscous flow through a Deformable Asymmetric Porous Channel: A numerical study

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Abstract: A numerical investigation has been made to study the influence of nonlinear thermal radiation on the flow of a viscous fluid. The flow is confined in a channel with deformable porous walls. Two numerical schemes, namely, Galerkin's method [GM] and Runge-Kutta-Fehlberg [RKF] method have been employed to obtain the solutions after reducing the governing equations to a system of nonlinear ordinary differential equations. A good agreement has been found in both the solutions. Flow behavior under the influence of arising parameters has been discussed in details with the help of suitable graphs. It is seen that the thermal radiation increases not only the rate of heat transfer at the wall but it also affects the temperature profile quite significantly. The last section summarizes the observations and conclusions made after the study.

Key words: Nonlinear thermal radiation, deformable walls, heat transfer, numerical solutions.

Nomenclature			
$\breve{x}$	Transverse Axis	v_l	Suction/injection velocity at lower wall
$\breve{y}$	Normal Axis	$\dot{h}$	Rate of change of height of the cha
$\breve{u}$	Dimensional velocity al	A_l	Permeability of lower wall
h	Semi height of the chan	A_u	Permeability of upper wall
$\breve{v}$	Dimensional velocity al	κ	Thermal conductivity
$\breve{p}$	Dimensional pressure	θ_w	Temperature difference parameter
$\breve{\rho}$	Density of the fluid	Rd	Radiation parameter
c_p	Specific heat at constant pressur	F	Dimensionless stream function
υ	Kinematic viscosity	θ	Dimensionless temperature function
$\breve{\theta}$	Dimensional temperature	a_R	Rosseland mean absorption coefficient