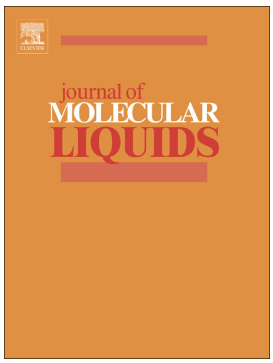

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PII: S0167-7322(18)31117-6
DOI: doi:10.1016/j.molliq.2018.04.010
Reference: MOLLIQ 8913

To appear in: *Journal of Molecular Liquids*

Received date: 4 March 2018
Revised date: 1 April 2018
Accepted date: 3 April 2018

Please cite this article as: Sumaira Qayyum, T. Hayat, Muhammad Ijaz Khan, Muhammad Imran Khan, A. Alsaedi , Optimization of entropy generation and dissipative nonlinear radiative Von Karman's swirling flow with Soret and Dufour effects. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Molliq(2018), doi:10.1016/j.molliq.2018.04.010

Optimization of entropy generation and dissipative nonlinear radiative Von Karman's swirling flow with Soret and Dufour effects

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Abstract: A computational investigation has been accomplished on nonlinear radiative flow between two impermeable stretchable rotating disks. thermo-diffusion and diffusion-thermo effects are also implemented. Furthermore nonlinear radiative heat flux, heat source/sink, dissipation and chemical reaction are considered. Thermodynamics second law is used for the investigation of entropy generation and Bejan number. Total entropy generation is inspected for various flow variables. Von Karman similarity transformations are utilized to develop coupled nonlinear ordinary differential systems and then tackled by semi computational/analytical technique namely homotopy technique. Particular consideration is given to the convergence procedure. The impacts of different flow variables like magnetic interaction, porosity, thermal diffusion, Prandtl number, diffusion thermo, radiative flux, heat source/sink, Schmidt number and chemical reaction variables on fluid velocity, concentration, temperature, volumetric entropy generation rate and Bejan number are discussed and analyzed. Velocity, temperature and concentration gradients at the disk surface are calculated numerically and discussed through Tables. Velocity reduces for both Hartman number and porosity parameter. Hartman number and radiation parameter enhances the entropy generation and Bejan number. Final conclusions of present flow analysis have been presented through concluding remarks.

Keywords: Entropy generation; thermo-diffusion and diffusion-thermo; Nonlinear thermal radiative heat flux; Joule heating; Chemical reaction.

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