

## Accepted Manuscript

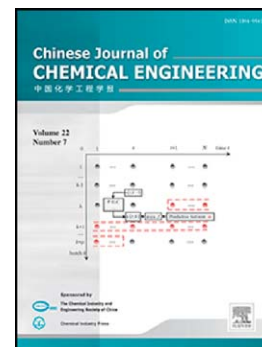
Diffusion of chemically reactive species in third grade flow over an exponentially stretching sheet considering magnetic field effects

T. Hayat, M. Ijaz Khan, M. Waqas, A. Alsaedi, T. Yasmeen

PII: S1004-9541(16)30381-0  
DOI: doi: [10.1016/j.cjche.2016.06.008](https://doi.org/10.1016/j.cjche.2016.06.008)  
Reference: CJCHE 610

To appear in:

Received date: 28 April 2016  
Revised date: 11 June 2016  
Accepted date: 24 June 2016



Please cite this article as: T. Hayat, M. Ijaz Khan, M. Waqas, A. Alsaedi, T. Yasmeen, Diffusion of chemically reactive species in third grade flow over an exponentially stretching sheet considering magnetic field effects, (2016), doi: [10.1016/j.cjche.2016.06.008](https://doi.org/10.1016/j.cjche.2016.06.008)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Diffusion of chemically reactive species in third grade flow over an exponentially stretching sheet considering magnetic field effects

T. Hayat <sup>a,b</sup>, M. Ijaz Khan <sup>a</sup>, M. Waqas <sup>a</sup>, A. Alsaedi <sup>b</sup> and T. Yasmeen <sup>c,d,\*</sup>

<sup>a</sup> Department of Mathematics, Quaid-I-Azam University 45320 Islamabad 44000, Pakistan

<sup>b</sup> Nonlinear Analysis and Applied Mathematics (NAAM) Research Group, Department of Mathematics, Faculty of Science, King Abdulaziz University, P. O. Box 80257, Jeddah 21589, Saudi Arabia

<sup>c</sup> Department of Mechanical Engineering, Imperial College London, London SW7 2AZ, UK

<sup>d</sup> Department of Mechanical Engineering, University of Engineering & Technology Peshawar, Pakistan

(\*Corresponding Email: tabassum.mechanical@gmail.com;t.yasmeen16@imperial.ac.uk, (Tabassam Yasmeen))

**Abstract:** This article addresses the magnetohydrodynamics (MHD) flow of a third grade fluid over an exponentially stretching sheet. Analysis is carried out in the presence of first order chemical reaction. Both cases of constructive and destructive chemical reactions are reported. Convergent solutions of the resulting differential systems are presented in series forms. Characteristics of various sundry parameters on the velocity, concentration, skin friction and local Sherwood number are analyzed and discussed.

**Keywords:** Chemical reaction; third grade fluid; exponentially stretching sheet; magnetic field.

## Introduction

There are several materials like shampoos, muds, soaps, apple sauce, sugar solution, polymeric liquids, tomato paste, condensed milk, paints, blood at low shear rate which show the characteristics of non-Newtonian fluids. The behavior of such materials cannot be explored by a single constitutive relationship because of their diverse properties. Hence different fluid models are developed in the past to describe the exact nature of non-Newtonian materials. Third grade fluid is a subclass of differential type non-Newtonian fluid. This fluid model exhibits shear thickening and shear thinning characteristics. Some studies on the third grade fluid can be seen in

Download English Version:

<https://daneshyari.com/en/article/4764257>

Download Persian Version:

<https://daneshyari.com/article/4764257>

[Daneshyari.com](https://daneshyari.com)