South East Asian J. of Mathematics and Mathematical Sciences
Vol. 16, No. 3 (2020), pp. 269-282

ISSN (Online): 2582-0850

ISSN (Print): 0972-7752

HOMOTOPY PERTURBATION METHOD FOR MHD BOUNDARY LAYER FLOW OVER A MOVING VERTICAL PLATE IN PRESENCE OF HEAT AND MASS TRANSFER

Manoj Kr. Sarma, Sujan Sinha and Bandita Das*

Department of Mathematics,
Assam downtown University, Guwahati - 781026, INDIA

E-mail : mksghy3009@gmail.com, mathssujangu@gmail.com

*Department of Mathematics,
Guwahati College, Bamunimaidam, Guwahati - 781021, INDIA

E-mail : banditadas1234@gmail.com

(**Received:** *Mar. 30, 2020* **Accepted:** *Sep. 16, 2020* **Published:** *Dec. 30, 2020)*

Abstract: The steady MHD boundary layer flow over a moving vertical plate with magnetic field and convective surface in presence of heat and mass transfer has been premeditated. Using He's Homotopy Perturbation Method (HPM), the system of non-linear ordinary differential equations governing the MHD boundary layer equations is solved. The influence of various significant physical parameters on the boundary layer flow is illustrated graphically with the physical interpretation. The obtained results point to the efficiency and convenience of the HPM. Utility of this model has been perceived in diverse industrial and chemical processes.

Keywords and Phrases: MHD, Heat Transfer, Mass Transfer, HPM, Schimdt number, Prandtl number.

2010 Mathematics Subject Classification: 76W05.

1. Introduction

Investigation of MHD boundary layer flow with heat and mass transfer has momentous applications in the fields of aeronautical plasma flows, nuclear reactor, magnetosphere, chemical engineering and electronics. Most of chemical engineering