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Unsteady Natural Convection Boundary Layer Flow with Mass Transfer and a Binary Chemical Reaction

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Abstract

We investigate a locally similarity solution of unsteady natural convection heat and mass transfer boundary layer flow past a flat porous plate. The effects of chemical reaction rate and Arrhenius activation energy on the velocity, temperature and concentration are also studied in this paper. The governing partial differential equations are reduced to ordinary differential equations by introducing locally similarity transformation Maleque [14]. Numerical solutions to the reduced non-linear similarity equations are then obtained by adopting Runge-Kutta and shooting method using the Nachtsheim-Swigert iteration technique. The results of the numerical solution are then presented graphically in the form of velocity, temperature and concentration profiles. The corresponding skin friction coefficient, the Nusselt number and the Sherwood number are also calculated and displayed in Table showing the effects of various parameters on them.