NOMENCLATURE

The standard notations are as follows:

$\vec{q}$ = Velocity vector of the fluid with Cartesian components u, v, w along x, y, z directions respectively,

$\overrightarrow{F}$ = Body force per unit mass,

$\overrightarrow{B}$ = Magnetic induction vector,

$\overrightarrow{J}$ = Electric current density,

$\overrightarrow{J} \times \overrightarrow{B}$ = Lorentz force per unit mass,

E = Electric field,

P = Pressure,

μ_e = Magnetic permeability parameter,

Q = Heat source / Sink per unit mass,

D = Coefficient of chemical molecular diffusivity,

σ = Electrical conductivity,

t = Time,

T = Temperature,

K = Permeability parameter,

C = Species concentration,

ϕ = Viscous dissipation per unit mass. It represents the time rate, at which energy is being dissipated per unit volume through the action of viscosity.

$$\frac{\vec{J}^2}{\sigma} = \sigma\,[\vec{E} + \vec{q} \times \vec{B}]^2$$

The Joulean heat per unit mass.

U_∞ = The reference velocity,

L= The reference length,

u, v, w = Velocity components in x, y and z directions respectively,

w_0 (>0) = Constant suction velocity of the liquid through the porous plane surface,

Z = Normal direction of vertical porous plane surface,

$\bar{Z}$ = Dimensional normal distance,

$\bar{C}$ = Dimensional species concentration,

C_p = Specific heat at constant pressure,

g = Acceleration due to gravity,

Gm = Thermal Grashoff number,

Gr = Mass Grashoff number,

M = Hartmann number (magnetic parameter),

$\overline{K}$ = Permeability parameter,

Pr = Prandlt number,

Ec = Eckert number,

Ω = Rotation parameter,

Sc = Schmidt number,

θ = Temperature,

$\lambda =$ Injection/Suction parameter,

$Da =$ Darcy number,

C_w = Wall dimensional concentration,

T_∞ = Free stream dimensional temperature,

C_∞ = Free stream dimensional concentration,

$\alpha =$ Fluid thermal diffusivity,

$K_{\lambda w} =$ Absorption coefficient at the wall,

$e_{b\lambda} =$ Planck's function,

R = Radiation parameter,

$\psi =$ Heat source parameter,

$Cr =$ Chemical reaction parameter,

u = Non-dimensional fluid velocity,

$\theta =$ Non-dimensional fluid temperature,

$\Phi =$ Non-dimensional species concentration,

$\tau_w =$ Wall shear stress,

$q_w =$ Local surface heat flux,

$Nu_x =$ Local Nusselt number,

$Re_x =$ Local Renolds number,

$\bar{T}$ = dimensional temperature

$\bar{t}$ = Dimensional time,

$\bar{U}$ = dimensional velocity

A = Constant,

Q = Dimensionless heat generation /absorption parameter,

S_0 = Soret number,

$\bar{q}_r$, R= Local radiative heat flux,

U_0 , n=Constants,

ε and εA = small less than unity,

v_0= Scale of suction velocity,

Greek symbols

β = Volumetric coefficient of thermal expansion,

$\bar{\beta}$ = Volumetric coefficient of expansion with concentration,

$\varepsilon (0 < \varepsilon < 1)$ = A constant,

κ = Thermal conductivity,

ν = Kinematic viscosity,

$\mu =$ Coefficient of viscosity,

ρ = Density,

$\emptyset$ = Species concentration,

ω = Frequency of oscillation of the plate temperature,

$\bar{\omega}$ = Dimensional frequency,

$\bar{\Omega}$ = Angular velocity of the rotating frame of reference,

Superscript

U′ = Derivative of U with respect to z.

Subscript

W = Conditions on the porous plane surface,

∞ = Conditions away from the porous plane surface.