

of Engineering Problems 5(4): 275-280.
<https://doi.org/10.18280/mmep.050401>

- [29] Akbar NS, Nadeem S, Haq RU, Khan ZH. (2013). Numerical solutions of Magnetohydrodynamic boundary layer flow of tangent hyperbolic fluid towards a stretching sheet. Indian J Phys. 87(11): 1121-1124. <https://doi.org/10.1007/s12648-013-0339-8>
- [30] Motsa SS, Makukula ZG. (2013). On spectral relaxation method approach for steady von kármán flow of a reiner-rivlin fluid with joule heating, viscous dissipation and suction/injection. Cent Eur J Phys. 11(3): 363-374. <https://doi.org/10.2478/s11534-013-0182-8>
- [31] Kameswaran P, Sibanda P, Motsa SS. (2013). A spectral relaxation method for thermal dispersion and radiation effects in a nanofluid flow. Boundary Value Problems 242. <https://doi.org/10.1186/1687-2770-2013-242>
- [32] Canuto C, Hussaini MV, Quarteroni A, Zang TA. (1988). Spectral Methods in Fluid Dynamics. Springer, Berlin.
- [33] Trefethen LN. (2000). Spectral Methods in MATLAB. SIAM, Philadelphia.
- [34] Malik MY, Salahuddin T, Hussain A, Bilal S. (2015). MHD flow of tangent hyperbolic fluid over a stretching cylinder: Using Keller box method. J Magn Mater. 395: 271-276. <https://doi.org/10.1016/j.jmmm.2015.07.097>

NOMENCLATURE

| | |
|----------|--|
| k | Thermal conductivity of the fluid (W/m K) |
| c_p | Specific heat maintained at unvarying pressure (J/kg K) |
| f | Non dimensional stream function |
| u, v | Velocity components (m/s) |
| x, r | Dimensionless coordinates |
| γ | Mechanical thermal dispersion coefficient |
| T | Temperature fluid ($^{\circ}C$) |
| T_w | Surface temperature |

| | |
|--------------|---|
| T_{∞} | Fluid ambient temperature |
| $u_w(x)$ | Stretching velocity |
| i | Time index at the time of navigation |
| L | Scale |
| t | Time |
| \bar{N} | Number of grid points |
| C_{fx} | Coefficient of skin friction |
| C | Fluid concentration |
| C_{∞} | Fluid ambient concentration |
| C_w | Concentration at the stretching surface |

Greek symbols

| | |
|--------------------------|---|
| α | Fluid thermal diffusivity (m^2/s) |
| μ | Fluid thermal viscosity ($N s/m$) |
| ρ | Density (kg/m^3) |
| τ_w | At wall shear stress |
| ϕ | Non-dimensional concentration |
| η | Similarity variable |
| $\nu = \frac{\mu}{\rho}$ | Kinematic viscosity of the fluid |
| μ_o | Zero shear rate of viscosity of the fluid |
| μ_{∞} | Infinite shear rate of viscosity of the fluid |
| Γ | Material constant with time dependent |
| θ | Dimensionless temperature |

Subscript

| | |
|----------|--------------------|
| w | Surface condition |
| ∞ | Infinity condition |

Super script

| | |
|---|-----------------------------------|
| ' | Derivative with respect to η |
|---|-----------------------------------|