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| Author(s) Name | Nur Ardiana Amirsom, UDDIN MOHEMMED JASHIM Md F Md Basir, AIM Ismail, O Anwar Beg, Ali Kadir | | |
| Contact Email(s) | ***jashim\_74@yahoo.com*** | | |
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| Abstract |  |

A theoretical study is presented for three-dimensional flow of bioconvection nanofluids containing gyrotactic microorganisms over a bi-axial stretching sheet. The effects of anisotropic slip, thermal jump and mass slip are considered in the mathematical model. Suitable similarity transformations are used to reduce the partial differential equation system into a nonlinear ordinary differential system. The transformed nonlinear ordinary differential equations with appropriate transformed boundary conditions are solved numerically with the bvp4c procedure in the symbolic software, MATLAB. The mathematical computations showed that an increase in Brownian motion parameter corresponds to a stronger thermophoretic force which encourages transport of nanoparticles from the hot bi-axial sheet to the quiescent fluid. This increases the nanoparticle volume fraction boundary layer. Fluid temperature and thermal boundary layer thickness are decreased with increasing stretching rate ratio of the bi-axial sheet. The present simulation is of relevance in the fabrication of bio-nanomaterials and thermally-enhanced media for bio-inspired fuel cells..