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| Title | Bioconvective electromagnetic nanofluid transport from a wedge geometry: *Simulation of smart electro-conductive bio-nanopolymer processing* | | |
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| Abstract |  |
| A mathematical model is presented for steady, two-dimensional, stagnation-point flow, heat, mass, and micro-organism transfer in a viscous, incompressible, bioconvective, electromagnetic nanofluid along a wedge with Stefan blowing effects, hydrodynamic slip, and multiple convective boundary conditions. Gyrotactic micro-organisms are present in the nanofluid and bioconvection arises, characterized by micro-organisms swimming under a competing torque. Similarity transformations are used to render the system of governing partial differential equations into a system of coupled similarity equations. The transformed equations are solved numerically with the BVP5C method. The impact of emerging parameters on dimensionless velocity, temperature, magnetic induction function, nanoparticle volume fraction, and density of motile micro-organisms is studied graphically. Furthermore, the responses of the local skin friction, local Nusselt number, local Sherwood number, and the wall gradient of density of motile micro-organism number to variation in these parameters are elaborated. Validation of solutions with previous studies based on special cases of the general model is included. The simulations are relevant to the processing of biological, electro-conductive nanomaterials and industrial hygienic coating systems exploiting combined electromagnetics, nanosystems, and microscopic, bio-propulsion mechanisms. | |