عنوان مقاله:

Bio-Convection Flow of Sutterby Nanofluid with Motile Microbes on Stretchable Sheet : Exponentially Varying Viscosity

محل انتشار:

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خلاصه مقاله:

The present work studies the bio-convection movement of an incompressible non-Newtonian Sutterby liquid on a stretchable surface in the existence of both nanomaterials and microbes. The liquid flows throughout a leaky region and is affected by a homogeneous vertical magnetic field. The energy spread is established by Ohmic and non-Newtonian dissipations in addition to an exponentially-space heat source, while the nanomaterials transmission is reachable with chemical reaction. The physical configuration is covered by force, temperature, nano-volume fractions, and microbes' formulae together with the appropriate border criteria. The novel aspect of this work is motivated due to its consideration of the exponential distribution of viscosity with temperature, concentration of microorganisms, and nanoparticles. Furthermore, the involvement of microbes in the flow across a stretched surface added another innovative feature, in light of its wide application range. The foremost format of nonlinear partial differential formulae is transformed into ordinary ones providing suitable match converters. These formulae are scrutinized by the fourth-order Runge-Kutta numerical technique with the support of shooting criteria. Consequently, arithmetical and graphical foundations of the objective distributions are achieved. The conclusions are examined, and significant results are summarized. Several important physiognomies are completed from the outcomes. The heat profile improves the efficient factors, which is an excellent rule that may be employed in various implications. Microbes' accumulation is found to increase with the increase of viscosity variation, whereas it decreases with the growth of Peclet, Lewis numbers, and the bio convection constants. Such findings may be useful in expecting the behavior of these microscopic organisms through similar flows.

کلمات کلیدی:

Non-Newtonian Sutterby liquid, Microorganisms, Permeable medium, Variable viscosity, Exponentially-space heat source