عنوان مقاله:

Non-Similar Computational Solution for Boundary Layer Flows of Non-Newtonian Fluid from an Inclined Plate with Thermal Slip

محل انتشار:

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خلاصه مقاله:

The laminar boundary layer flow and heat transfer of Casson non-Newtonian fluid from an inclined (solar collector) plate in the presence of thermal and hydrodynamic slip conditions is analysed. The inclined plate surface is maintained at a constant temperature. The boundary layer conservation equations, which are parabolic in nature, are normalized into non-similar form and then solved numerically with the well-tested, efficient, implicit, stable Keller-box finite-difference scheme. Increasing velocity slip induces acceleration in the flow near the inclined plate surface. Increasing velocity slip consistently enhances temperatures throughout the boundary layer regime. An increase in thermal slip parameter strongly decelerates the flow and also reduces temperatures in the boundary layer regime. An increase in Casson rheological parameter acts to elevate considerably the velocity and this effect is pronounced at higher values of tangential coordinate. Temperatures are however very slightly decreased with increasing values of Casson rheological parameter.

کلمات کلیدی:

Newtonian fluid mechanics, Non, box numerical method, Inclined plate, solar energy, Yield stress, Keller, Slip condition, Heat transfer, Skin friction, Nusselt number, Boundary layers