# Flow and heat transfer over a rotating porous disk in nanofluids.

ABSTRACT

The steady flow of an incompressible viscous fluid due to a rotating disk in a nanofluid is studied. The transformed boundary layer equations are solved numerically by a finite difference scheme, namely the Keller-box method. Numerical results for the flow and heat transfer characteristics are obtained for various values of the nanoparticle volume fraction parameter φ and suction/injection parameter h0. Two models for the effective thermal conductivity of the nanofluid, namely the Maxwell–Garnett model and the Patel model, are considered. It is found that for the Patel model, the heat transfer rate at the surface increases for both suction and injection, whereas different behaviors are observed for the Maxwell–Garnett model, i.e. increasing the values of φ leads to a decrease in the heat transfer rate at the surface for suction, but increases for injection. The results of this study can be used in the design of an effective cooling system for electronic components to help ensure effective and safe operational conditions.

**Keyword:** Heat transfer; Nanofluid; Nanoparticles; Rotating porous disk; Numerical solution.