Universiti Teknologi MARA

Impact of Nanoparticle Shape on Aligned MHD Free Convection Flow of Hybrid Nanofluid over a Vertical Plate with Convective Boundary Condition

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Report submitted in fulfillment of the requirements for Bachelor of Science (Hons.) Management Mathematics Faculty of Computer and Mathematical Sciences

July 2020

STUDENT'S DECLARATION

I certify that this report and the research to which it refers are the product of my own work and that any ideas or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.

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AUGUST 5, 2020

ABSTRACT

This study conducted to investigate the impact of nanoparticles' shape on the thermal conductivity behavior of hybrid nanofluid. It focused on the effect of six different physical conditions on velocity and temperature profile as well as the value of skin friction and Nusselt number. There are five nanoparticles shape involved in this study which are spherical, bricks, cylindrical, platelet, and blade. This study applied numerical approach and method used is Forth-Order Runge Kutta numerical method. Similarity transformation was used to reduce the non-dimensionless partial differential equations in the form of dimensionless ordinary differential equation. The results obtained by the study indicates that the blade shape is high in thermal boundary layer thickness and high in thermal conductivity since the temperature profile of the hybrid nanofluid is high. Meanwhile, the spherical shape temperature profile is the lowest which means that the hybrid nanofluid with the shape of the spherical nanoparticle has less thermal boundary layer thickness and its thermal conductivity is low. Besides that, the results also show that the blade shape has the highest skin friction and Nusselt number compared to the other nanoparticles' shape. All in all, the shape of the nanoparticles can affect the behavior of nanofluid.

Keywords: Nanoparticle shape, Aligned MHD, Free convection, Hybrid nanofluid, Vertical plate, Convective boundary condition

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