

Universiti Teknologi MARA

**Aligned MHD Free Convection Flow of
Magnetic Nanofluid over a Moving
Vertical Plate**

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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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ABSTRACT

Nanofluids have become a topic that gradually receiving broad attention on the usage of it on enhancing the rate of heat transfer in order to conserve energy. Thus, it is important to study about nanofluids in prior to have a clear vision of the nanofluids behaviour. This study aims to investigate the behaviour of aligned MHD free convection flow of magnetic nanofluid over a moving vertical plate. Moreover, water based fluid is used to dissolve the magnetic nanoparticle which is ferroparticle, three situations are considered here; the plate is moving against the flow, the plate is static and the plate is moving together with the flow. The governing equations in the form of partial differential equations have been reduced to nonlinear ordinary differential equations by using similarity transformation. The fourth order Runge-Kutta package in MAPLE software is used to numerically solve the dimensionless governing equations. This study found that Grashof number, inclined angle and magnetic field strength improved the velocity profile but declined the temperature profile. While nanoparticle volume fraction decreases the velocity profile but increase the temperature profile. Other than that, numerical results presents that the dimensionless parameters have positive relationship with the skin friction coefficient and Nusselt number. When the plate moves together with the flow, the skin friction is lower compared to when it is static or moving against with the flow but the Nusselt number is high whenever it moves together with the flow.

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