UNIVERSITI TEKNOLOGI MARA

FINAL YEAR PROJECT (MSP 660)

UNSTEADY STAGNATION-POINT FLOW AND HEAT TRANSFER IN NANOFLUID USING BUONGIORNO'S MODEL WITH ZERO NANOPARTICLES HEAT FLUX

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ABSTRACT

In this research, unsteady stagnation point flow and heat transfer in nanofluid using Buongiorno's model with zero nanoparticles heat flux was numerically investigated. Heat transfer fluids are substances that transmit heat from one component to another. Nanofluids have been used in a wide range of applications, including electronics, biomedicine, food, transportation, and nuclear reactors. The purpose of the study is to enhance the prior model by introducing a modification that assumes negligible nanoparticle flux. It also serves the purpose of developing the mathematical model, carrying out mathematical formulations and analysing the model, and generating numerical results for multiple solutions in convection boundary layer flows. Buongiorno's nanofluid model is well suited to use in the investigation of fluid flow and heat transfer. By using this model, experiments on two-dimensional (2D) unsteady stagnation point flow and heat transfer past a permeable shrinking sheet in nanofluids will be analysed. Furthermore, this study was made by improvising the model from the previous study where it will be tested with zero nanoparticles heat flux. Similarity equations are created by applying suitable similarity transformation, and the shooting method is then utilised to solve the equations. For some values of the governing parameters, such as the unsteadiness parameter, the mass suction parameter, the Brownian motion parameter, the thermophoresis parameter, and the Lewis number, the results for the skin friction coefficient, the local Nusselt number, and the local Sherwood number, as well as the velocity, temperature, and concentration profiles are obtained. The findings are graphically presented and discussed using the new boundary conditions which meet the zero nanoparticles heat flux differ to the prior researcher the momentum equation does not have +1 and assuming unsteadiness parameter $A = 0$. Dual solutions are discovered for a specific range of wall mass suction, unsteadiness, and nanofluid parameters.