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UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

MHD FLOW AT STAGNATION POINT OF PERMEABLE STRETCHING SHRINKING WALL USING BVP4C METHOD

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(P27S22)

Report submitted in partial fulfillment of the requirement for the degree of
Bachelor of Science (Hons.) Mathematics
Faculty of Computer and Mathematical Sciences,
Bachelor of Science (Hons.) Management Mathematics And Bachelor of Business Administration (Hons.) Business Economics

FEBRUARY 2023

ACKNOWLEDGEMENTS

IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

At the outset, we are grateful to Allah S.W.T for giving us the strength to complete this project successfully.

This research would not have been possible without the opportunity from UiTM. We would like to express our deep and sincere gratitude to our research supervisor, Dr. Siti Hidayah Muhad Saleh for guiding and providing her invaluable comments and suggestions throughout development of the research. She continuously shares her knowledge with us and assists us to bring into a quality research paper.

The completion of this research could not have been accomplished without the assists from our lecturer, Dr. Zahari Md Rodzi. We are grateful for his words of advice during consultation in the subject MSP660. Not to be left out, the support of our course mates that are striving in completing their research as well.

Last of all, appreciation to our family, especially towards our parents that encourage us in carrying out the research as well as facilitate us with necessities.

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ABSTRACT

This study take account of MHD Flow At Stagnation Point Of Permeable Stretching Shrinking Wall Using BVP4C Method. The method indicated in this study is BVP4C and software selected to run the results is MATLAB. This paper embraces the transformation and derivation of equations, justification of method and effects of changing of parameters. The analysis set off by applying a general Partial Differential Equation (PDE) obtained from the preceding paper. Thenceforth, the Ordinary Differential Equation (ODE) with order 3 attained by deriving the PDE using similarity transformation approach. Then, the third order ODE reduced to first order. Afterwards, the equations and boundary conditions were coded into MATLAB software to generate results. The results from MATLAB were compared with the results from previous paper to authorize the BVP4C method. Thereafter, the effects of changing parameters were examined by varying the value of considered parameters and the graph is generated. There are three objectives proposed in this study which are to derive the numerical solution by using the BVP4C method from the modified ODE, to validate the method by comparing obtained results with the previous paper and to determine the effects of changes in considered parameters. The results indicates that the BVP4C method can be used in this study as it shows the similar results as the previous paper. The effects of parameters are illustrated in graphs. It is found that the velocity profile is increasing, but the temperature profile and the nanoparticle friction profile are decreasing with parameter M and s. Then, the effects of parameter Nb and Nt on temperature and nanoparticle friction profiles are alike. The increment of both parameters shows temperature profile is increasing and the decrement on nanoparticle friction profile. The variation of $f''(0)$ is increasing as s is increasing. Next, $-\theta'(0)$ decrease as Nb increase for $s = -1,1$. Lastly, $-\varphi'(0)$ decrease as Nb and Le increase for $s = -1$ and $-\varphi'(0)$ increase as Nb and Le increase for $s = 1$.