

**UNIVERSITI TEKNOLOGI MARA**

**TECHNICAL REPORT**

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

**AALIAA BINTI MOHD ARRIFFIN – 2020898564  
AZIAH NUR AZYAN BINTI AZHAR – 2021117955  
MUHAMMAD LUQMAN AMIEN BIN MOHAMMAD HIDAYAT –  
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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  $s = 1$ .