

**UNIVERSITI TEKNOLOGI MARA**

**TECHNICAL REPORT**

**NUMERICAL SOLUTION OF HEAT TRANSFER AND SKIN  
FRICTION FOR MIXED CONVECTION STAGNATION FLOW  
TOWARDS A VERTICAL SHRINKING SHEET BY USING  
BVP4C**

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

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## **ABSTRACT**

This study examined the heat transfer and skin friction of mixed convection at stagnation point flow towards a vertical shrinking sheet and considered the effects of boundary layer thickness on velocity and temperature profiles. A system of nonlinear partial differential equations is applied to model the physical issue, which is then properly transformed into nonlinear ordinary differential equations. The purposes of this research are to solve the similarity equations produced by using the similarity transformation approach, to obtain the numerical result from the transformed ordinary differential equation by using BVP4C method, and to analyze the numerical result obtained from the transformed ordinary differential equation. By using BVP4C method in the MATLAB software, these equations and the related boundary conditions are numerically solved. The results presented the smoothness of two-dimensional heat transfer and skin friction graph behavior for the shrinking sheet problems and compared it to the stretching sheet problem. The specification of shrinking sheet problem was also shown through the skin profiles that have been presented. From the result, we obtained that when the curve of skin friction and heat transfer approaching the negative regions of  $\gamma$ , the curve decreases dramatically. In conclusion, there was a favourable agreement between the comparative results.