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# Findings

Boundary layer flow has many applications in several fields of science and technology, including astrophysics, fibre technology, the polymer yarn business, etc., which makes them a subject of great interest. The rapid advancements in numerical simulation of fluid dynamics and heat transfer problems have made them an important focus for both basic and applied research, as well as a growing importance in engineering practice. From a mathematical perspective, the analytical solutions to the governing equations, such as the continuity equation and energy equations, are challenging since they are extremely non-linear in nature. Numerical techniques like the Runge-Kutta method, the homotopy analysis method, the collocation method, etc. have become quite remarkable in fluid dynamics applications due to their complexity and flexibility. These investigations make use of the MATLAB simulation tool; therefore, it is crucial to comprehend the tool and execute the programmes in order to get results. A basic understanding of fluid flow is required for the design of most engineering applications, including vehicles, ships, airplanes, air conditioning systems, pipelines, heat exchangers, valves, artificial heaters, spillways, dams, and irrigation systems. The two types of forces acting on an infinitesimal fluid element are surface forces and body forces. The method of solving fluid dynamics problems usually involves adjusting the fluid's density, temperature, pressure, and velocity as functions of time and space. We construct an appropriate spline approach to compute the velocity parameters of the flow problem. Applying the similarity transformation, the flow problem has been transformed into a non-linear third-order ordinary differential equation with the necessary boundary conditions. The primary goal of the current thesis is to employ spline techniques to investigate boundary layer flow and heat transfer for various geometries. The approach of similarity transformation is utilised to examine the behaviour of the flow field. The dimensionless velocity and temperature profiles are presented in tables for the different flow parameters and also projected graphically to help with the understanding of the physical insight of the flow problem. The thesis consists of six chapters. An overview of each chapter is provided below.