DUSTY CASSON FLUID FLOW CONTAINING SINGLE-WALL CARBON NANOTUBES OVER A STRETCHING SHEET

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ABSTRACT

The applications of this research are significant in various engineering and industrial fields for example drug delivery mechanisms for medical industry, paint and coting for chemical field and others. A non-Newtonian fluid with suspended solid particles is called a dusty Casson fluid. It is a form of two-phase fluid flow in which there is interaction between the fluid and the solid particles. Thus, the complex interplay and mutual influence of Casson fluid, single-wall carbon nanotubes (SWCNTs) and dust particles over a stretching sheet characterise their interaction in the fluid flow system. Moreover, the aligned magnetic field and thermal radiation effect are associated together to influence the flow region. Thereby, this study focuses on dusty Casson fluid flow containing single-wall carbon nanotubes over a stretching sheet. The similarity transformation variables will be applied to simplify the partial differential equations (PDEs) into ordinary differential equations (ODEs) form with less complexity. The governing ODEs obtained will be encoded in MATLAB software using the Keller-Box method. The obtained results will then be compared to previous research publications in order to validate suggested mathematical solution. Following that, the result and outcome will be tabulated and graphically presented a temperature profile and velocity profile over several parameters including Casson parameter, mass concentration of particle phase, magnetic field parameter, thermal radiation parameter, fluid particle interaction parameter, Prandtl number and specific heat ratio of mixture. Industry practitioners can use the mathematical findings from this study as a reference before carrying out costly and risky tests.

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TABLE OF CONTENTS