



SEMINAR



Mathematical Treatment of Heat Transfer in Engineering Fluid Flows and Solids

Abstract: Computational modelling of heat transfer in fluid flows and solids is an indispensable tool for improving engineering system operations and new product development. Heat transfer seems to pervade all aspects of engineering systems. Almost everything experiences heating or cooling of some kind. Enhancement of heating or cooling in engineering processes may create a saving in energy, reduce process time, raise thermal rating and lengthen the working life of equipment. Meanwhile, finding effective solution to heat transfer problems has remain one of the great challenges of all engineering and industrial processes. In recent time, the advent of technology and advanced computational techniques coupled with complex mathematical models have greatly enhanced the ability to analyse various types of heat transfer problems in engineering fluids and solids. In this presentation, three innovative model problems are theoretically examined, namely: i) Flow process of hybrid nanofluids for engineering cooling via heat transfer enhancement mechanism, ii) Thermal Operation of rectangular porous fin for electronics cooling and iii) Thermal stability of energetic reactive materials for industrial safety. The models differential equations are obtained and tackled semi-analytically using perturbation method with a special type of Hermite-Padé approximation technique and also numerically using shooting method coupled with fourth order Runge-Kutta integration scheme. Pertinent results are presented graphically and discussed quantitatively.

Keywords: Hybrid nanofluid; Thermal boundary layer; Porous fin operation; Reactive energetic materials; Thermal stability analysis

All Interested are invited!!!

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PROFESSOR
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- * Professor Makinde is a distinguished Professor of Applied and Computational Mathematics at the Faculty of Military Science, Stellenbosch University, South Africa.
- * His research covers a broad range of topics, including fluid mechanics, Nano fluid dynamics, heat and mass transfer, hydrodynamic stability, dynamical systems, bio-mathematics and epidemiological modelling, combustion theory, computational mathematics and improved perturbation techniques.
- * He has graduated over 32 PhD, 72 MSc and 200 BSc (and computations Hons) candidates in the field of applied mathematics

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