CoE-MaSS weekly seminar series

THE DST-NRF CENTRE OF EXCELLENCE IN MATHEMATICAL AND STATISTICAL SCIENCES (CoE-MaSS) WOULD LIKE TO PRESENT A SEMINAR BY

Taha Aziz

(Centre of Excellence in Mathematical and Statistical Sciences, Wits University)

"Group Theoretical Analysis and Invariant Solutions for Time-Dependent Flow Model of a Non-Newtonian Fluid"

Friday, 26 February 2016
10h30-11h30

Broadcast live from:
Videoconferencing Facility, 1st Floor
Mathematical Sciences Building, Wits West Campus

How to connect to this seminar remotely:
You can connect remotely via Vidyo to this research seminar by clicking on this link:
http://wits-vc.tenet.ac.za/flex.html?roomdirect.html&key=y0SSOwFsvsidbzg4qFdWXvvQtyI
and downloading the Vidyo software before the seminar.
You must please join in the virtual venue (called *"CoE Seminar Room (Wits)"* on Vidyo) strictly between **10h00-10h15**. No latecomers will be added.

Important videoconferencing netiquette:
Once the seminar commences, please mute your own microphone so that there is no feedback from your side into the virtual room. During the Q&A slot you can then unmute your microphone if you have a question to ask the speaker.

Title:
Group Theoretical Analysis and Invariant Solutions for Time-Dependent Flow Model of a Non-Newtonian Fluid.

Presenter:
Dr Taha Aziz, Post Doctoral Fellow, Centre of Excellence in Mathematical and Statistical Sciences, University of the Witwatersrand, Johannesburg, South Africa; tahaaziz77@yahoo.com

Abstract:
This work describes the time-dependent flow of an incompressible non-Newtonian fluid over an infinite rigid plate. The flow is induced due to the arbitrary velocity V(t) of the plate. The fluid occupies the porous half space y>0 and is also electrically conducting in the presence of a constant applied magnetic field in the transverse direction to the flow. Analytical solutions of the governing nonlinear partial differential equation for the unidirectional flow of a third grade fluid are established using the symmetry approach. We construct three types of analytical solutions by employing the Lie symmetry method and the better solution from the physical point of view is shown to be the non-travelling wave solution. We also present numerical solutions of the governing PDE and and compare with the analytical results. Finally, the influence of emerging parameters are studied through several graphs with emphasis on the study of the effects of the magnetic field and non-Newtonian fluid parameters.