



UNIVERSIDADE DO ALGARVE

Faculdade de Ciências e Tecnologia

Workshop on Partial Differential Equations and Applications

27 de Junho de 2014, 14:00 h

Sala 2.11 do Ed. 2 da FCT, Campus de Gambelas, Universidade do Algarve, Faro

PROGRAMME

14:00–14:40 h Fernando Carapau (invited speaker), Universidade de Évora.

Title: One-dimensional viscoelastic fluid model.

Abstract: We study the unsteady motion of a viscoelastic fluid modeled by a second-order fluid where normal stress coefficients and viscosity depend on the shear rate by using a power-law model. To study this problem, we use the one-dimensional nine-director Cosserat theory approach which reduces the exact three-dimensional equations to a system depending only on time and on a single spatial variable. Attention is focused on some numerical simulation of unsteady/steady flows for average pressure, wall shear stress and on the analysis of perturbed flows.

14:45–15:15 h Ana Paiva, Universidade do Algarve.

Title: On the existence of solutions for a steady problem of the RANS model.

Abstract: In this talk we aim to present some recent advances for proving the existence of solution to a n -dimensional system of Navier-Stokes equations coupled with the equations for the kinetic turbulent energy, with non-linear functions depending on the unknown velocity and turbulent kinetics energy. This system of equations is frequently used when trying to model fluid turbulence.

15:15–15:45 h Coffee break.

15:45–16:25 h Marília Pires (invited speaker), Universidade de Évora.

Title: A traceless variant of the Johnson-Segalman viscoelastic model.

Abstract: A traceless variant of the Johnson-Segalman viscoelastic model is presented. The viscoelastic extra stress tensor is decomposed into its traceless (deviatoric) and spherical parts, leading to a reformulation of the classical Johnson-Segalman model. The equivalence of the two models is established comparing model predictions for simple test cases. The new model is validated using several 2D benchmark problems. The structure and behavior of the new model are discussed.

16:30–17:00 h Hermenegildo Borges de Oliveira, Universidade do Algarve.

Title: Asymptotic behavior of the solutions to generalized Navier-Stokes equations.

Abstract: In this talk we consider two very general models of Navier-Stokes equations. The first one generalizes Stokes law to the case in which the exponent that characterizes the flow is variable. This model is being now well succeeded in the applications, in particular to model trembling fluids of which electro-rheological, magneto-rheological or thermo-rheological fluids are the best examples. The other model is more theoretical and consists of considering the case of anisotropic diffusion. For both models, we establish the conditions under which we can prove the finite time extinction property. We study the large time behavior of the solutions to these problems as well.