

Fernando Carapau (University of Évora, Portugal)

1D Simulations of shear-thinning fluids with applications to blood flow

Abstract: In this talk, we consider blood in small vessels modeled as an incompressible shear-thinning fluid in a straight rigid and impermeable tube with circular cross-section. The full 3D unsteady model is simplified using a one-dimensional hierarchical approach based on the Cosserat theory related to fluid dynamics. From this approach, we obtain the unsteady relationship between mean pressure gradient (wall shear stress, respectively) and volume flow rate over a finite section of the tube with constant radius for the specific case of power law viscosity function. Attention is focused on some numerical simulation of steady/unsteady flows and on the analysis of perturbed flows.