

You are cordially invited to our:
Department Seminar

Topic: Modeling and simulation of compressible multimaterials

Speaker: Professor Angelo Iollo
Institute of Mathematics of Bordeaux
University of Bordeaux 1

Date: Thursday, 23 May 2013

Time: 11.00am to 12.00pm

Venue: EA-06-05 (map of NUS can be found at <http://map.nus.edu.sg/>)

Abstract

The speaker will discuss a system of hyperbolic conservation laws that can model either gas flows or large deformations of compressible elastic materials in either a physical (Eulerian) or reference (Lagrangian) domain. The constitutive law characterizing each different (gas, liquid, elastic) material will be considered under the hypothesis of material indifference and thermodynamic consistency. Then, he will discuss the PDE system obtained in terms of characteristic pattern and hyperbolicity conditions. Finally, the speaker will present a simple numerical method to simulate the interaction of non-miscible compressible materials separated by an interface. The media considered may have significantly different physical properties and constitutive laws, describing for example fluids or hyperelastic solids. The model is fully Eulerian and the scheme is the same for all materials. By construction, the material discontinuity remains sharp during its evolution over the fixed cartesian mesh. He will show stiff numerical illustrations in case of gas-gas, gas-water, gas-elastic solid interactions in the large deformation regime.

About the Speaker

Professor Angelo Iollo obtained his M.Sc in Aeronautical Engineering from the Polytechnic University of Turin, Italy in 1991 and thereafter his Ph.D from the same university and the NASA Langley Research Centre, US in 1995.

Following which his appointments and honours are as follows:

Appointments:

- 1996: Staff scientist, Institute for Computer Application in Science and Engineering, NASA Langley Research Center, US.
- 1997 - 1999: Marie-Curie Fellow, Inria Sophia Antipolis, France
- 1999 - 2004: Assistant Professor, Aerospace Engineering, Politecnico di Torino, Italy
- 2004 - present Full professor of applied mathematics, Université Bordeaux 1

Honours:

- 2011: La Recherche prize for mathematics. Motivation: models for tumor growth predictions.
- 1997: Marie Curie Fellowship. Two-year stipend for research funded by European Union.

**** Admission is free. All are welcome to attend. ****