ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

Prof. Marco Picasso
Mathematics Institute of Computational Science and Engineering - MATHICSE

SEMINAR OF NUMERICAL ANALYSIS

- **WEDNESDAY 12 DECEMBER 2012 - ROOM GC A3 30 – 4:15 pm**

***Dr. Sebastian Boyaval**, (Ecole Nationale des Ponts et Chaussées, Laboratoire d'hydraulique, France)* will present a seminar entitled:

"A new model for shallow viscoelastic fluids"

Abstract:

We will present a new reduced model for gravity-driven free-surface flows of shallow viscoelastic fluids (work in collaboration with F. Bouchut). It is obtained by a formal asymptotic expansion of the upper-convected Maxwell model when the viscosity is small like the aspect ratio of the thin layer of fluid, while the relaxation time is kept finite. Additionally to the classical layer depth and velocity in shallow water models, our system describes also the evolution of two scalar stresses.

We will discuss some mathematical properties of the model. (i) It has an intrinsic energy equation. (ii) But the physically relevant energy is non-convex with respect to the conservative variables. (iii) Fortunately, it is convex with respect to the physically relevant pseudo-conservative variables. (iv) Thus we propose a suitable well-balanced finite-volume discretization involving an approximate Riemann solver.
We will finally illustrate the new model with numerical simulations.

Lausanne, 1st November 2012 /MP/cr