Master *Mathematical Modelling*
Ecole Polytechnique and
University Pierre & Marie Curie

Course given by C. Chalons and F. Coquel

Practical work subject: a conservative scheme for the computation of nonclassical solutions defined by kinetic relations

We are interested here in the computation of *nonclassical* solutions associated with *nonconvex* scalar conservation laws. Nonclassical solutions have the distinctive feature of being dynamically driven by small-scale effects such as diffusion, dispersion, and other high-order phenomena. Their selection requires an additional jump relation, called a kinetic relation. From a numerical point of view, it is very challenging to satisfy the validity of this kinetic relation.
We propose to study a conservative scheme based on reconstruction techniques, derived in the paper entitled *Convergent and conservative schemes for nonclassical solutions based on kinetic relations*, by B. Boutin, C. Chalons, F. Lagoutière and P.-G. LeFloch, and published in Interfaces and Free Boundaries, vol 10, no. 3 (2008).

We first ask to implement and validate the method. Then, we ask to compare the solutions with the ones given by the Godunov scheme. At least the first three test cases of the paper will be reproduced.