

# List of abstracts

## On a stochastic $p(\omega, t, x)$-Laplace equation

**Aleksandra Zimmermann**

A stochastic forcing of a non-linear singular/degenerated parabolic problem of $p(\omega, t, x)$-Laplace type is proposed in the framework of Orlicz Lebesgue and Sobolev spaces with variable random exponents. We give a result of existence and uniqueness of the solution, for additive and multiplicative problems. This is a joint work with Guy Vallet and Petra Wittbold.

## *Scalar conservation laws with multiplicative stochastic perturbation*

**Petra Wittbold**

We consider the Cauchy problem for the following stochastic partial differential equation

$$du = \operatorname{div} \vec{f}(u)dt + h(u)dW \text{ on } \Omega \times (0,T) \times \mathbb{R}^d$$

with initial condition $u(0, \Delta) = u_0 \in L^2(\mathbb{R}^d)$, where $f$, $h$ are Lipschitz continuous functions and $W = \{W_t, \mathcal{F}_t; 0 \leqslant t \leqslant T\}$ is a 1-dimensional adapted continuous Brownian motion on a probability space $(\Omega, \mathcal{F}, P)$ for the filtration $(\mathcal{F}_t)$. Results on existence and uniqueness of an appropriate notion of stochastic entropy solution will be presented. This is a joint work with Caroline Bauzet and Guy Vallet.

## *Convergence of monotone finite volume schemes for hyperbolic scalar conservation laws with multiplicative noise*

**Julia Charrier**

We consider nonlinear hyperbolic scalar conservation laws with multiplicative noise on $\mathbb{R}^d$. After having presented the concept of stochastic entropy solution, I will quickly present an existence and uniqueness result for the stochastic entropy solution. The main part of the talk will be devoted to the definition of stochastic monotone finite volume schemes and the proof of the convergence of these schemes to the stochastic entropy solution under a stability condition. For the sake of clarity, I will present the proof in details only in the case of a monotone flux with upwind scheme and explain after that how to extend the proof to the general case. This is a joint work with Caroline Bauzet and Thierry Gallouët.

## *Kinetic formulation and invariant measures for stochastic conservation laws*

**Arnaud Debussche**

I will first briefly describe the kinetic formulation for deterministic and stochastic scalar first-order conservation laws. Then, I will show how to use this formulation to prove existence and uniqueness in the stochastic case in any space dimension. And under an hypothesis of non-degeneracy of the flux, explain how it allows to study the long-time behavior. For sub-cubic fluxes, the existence of an invariant measure can be obtained while for sub-quadratic fluxes we show uniqueness and ergodicity of the invariant measure also holds. This is a joint work with Julien Vovelle.

## *On a stochastic degenerate parabolic problem*

**Guy Vallet**

We present a way to adapt the formulation proposed by J. Carrillo for degenerate parabolic problems to the case of a stochastic force. Then, we give a result of existence and uniqueness of a stochastic entropy solution. This is a joint work with Caroline Bauzet and Petra Wittbold.

## *Stochastic isentropic Euler equations*

**Julien Vovelle**

We give some results on the existence of solutions to the isentropic Euler system of equations with a stochastic forcing term in the momentum equation. We also discuss the existence of invariant measures. This is a joint work with Florent Berthelin.

## *Dealing with noise in hydraulic engineering*

**Sébastien Boyaval**

Hydraulic engineers need to use simple enough mathematical models for their numerical computations in complex industrial problems. Many physical processes are therefore lost at various scales during the modelling stage. We will present recent attempts at reintroducing noise in classical hydraulical models, with adequate distributions so as to retrieve the dispersion experimentally observed when one wants to match numerical predictions. This is a joint work with Emmanuel Audusse.