

Existence and uniqueness results for the continuity equation, and applications to the chromatography system

Laura V. Spinolo, University of Zurich

I will discuss some new existence and uniqueness result for the continuity equation

$$\partial_t u + \operatorname{div}_x(bu) = 0.$$

In the previous expression, the unknown $u(t, x)$ is real-valued, $(t, x) \in [0, +\infty[\times \mathbb{R}^d$ and $b(t, x) \in \mathbb{R}^d$. In particular, I will discuss the case that b has BV (bounded total variation) regularity in $]0, +\infty[\times \mathbb{R}^d$, but the BV norm blows up as $t \rightarrow 0^+$. This regularity is critical in view of a counterexample due to De Pauw. If time allows, I will then discuss applications to a system of conservation laws known as the chromatography system. The talk will be based on a joint work with L. Ambrosio, G. Crippa and A. Figalli.