

Comportement asymptotique des équations de convection-diffusion fractionnaires / Asymptotic behaviour for fractional diffusion-convection equations

lundi 21 mai 2018 10:00 (1 heure)

In this talk, we analyze the long time behaviour of the solutions of the equation

$$u_t(t, x) + (-\Delta)^{\alpha/2} u(t, x) + (f(u))_x = 0, \quad t \in (0, \infty), \quad x \in \mathbf{R},$$

where $\alpha \in (0, 2)$ and $f(s) = |s|^{q-1} s/q$ with $q \in (1, \infty)$. We present some previous results on the asymptotic expansion of the solutions when the time goes to infinity. We prove that in the one-dimensional case, for $q \in (1, \alpha)$ the asymptotic behaviour is given by the entropy solution of the conservation law $u_t(t, x) + (f(u))_x = 0$, $u(0) = M\delta_0$ where M is the mass of the initial data. The proof relies on tricky inequalities to guarantee an Oleinik type inequality $(u^{q-1})_x \leq 1/t$.

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