



复旦大学数学科学学院 数学综合报告会

报告题目: **A uniqueness result for the decomposition of vector fields in \mathbb{R}^d**

报告人: Stefano Bianchini

SISSA (Scuola Internazionale Superiore di Studi Avanzati)

报告时间: 2017-06-14 星期三 15:30

报告地点: 光华东主楼 1801

摘要: Given a vector field $\rho(1, b) \in L^1_{loc}(\mathbb{R}^+ \times \mathbb{R}^d, \mathbb{R}^{d+1})$ such that $\text{div}_x(\rho(1, b))$ is a measure, we consider the problem of uniqueness of the representation η of $\rho(1, b)L^{d+1}$ as a superposition of characteristics $\gamma : (t-\gamma, t+\gamma) \rightarrow \mathbb{R}^d, \dot{\gamma} = b(t, \gamma(t))$. We give conditions in terms of a local structure of the representation η on suitable sets in order to prove that there is a partition of \mathbb{R}^{d+1} into disjoint trajectories $\vartheta_a, a \in A$, such that the PDE

$$\text{div}_x(u \rho(1, b)) \in M(\mathbb{R}^{d+1}), u \in L^\infty(\mathbb{R}^+ \times \mathbb{R}^d),$$

can be disintegrated into a family of ODEs along ϑ_a with measure r.h.s.. The decomposition ϑ_a is essentially unique. We finally show that $b \in L^1_t(BV_x)_{loc}$ satisfies this local structural assumption and this yields, in particular, the renormalization property for nearly incompressible BV vector fields.

This is a joint work with Paolo Bonicatto.

非线性数学模型与方法教育部重点实验室
中法应用数学国际联合实验室
上海市现代应用数学重点实验室
复旦大学数学研究所

