

Lagrangian flows and continuity equations in metric measure spaces

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This talk is based on a joint work with L. Ambrosio [1], where we establish, for a wide class of metric measure spaces, an analogue of the celebrated DiPerna-Lions theory on well-posedness of flows driven by Sobolev vector fields. Key results are existence and uniqueness theorems for continuity equations and an abstract superposition principle which provides a link between “Eulerian” and “Lagrangian” viewpoints.

When specialized to the setting of Euclidean or infinite dimensional (e.g. Gaussian) spaces, large parts of previously known results are recovered at once. Moreover, the class of $\text{RCD}(K, \infty)$ metric measure spaces, recently introduced by Ambrosio, Gigli and Savaré, object of extensive recent research, fits into our framework. Therefore we provide, for the first time, well-posedness results for ODE's under low regularity assumptions on the velocity and in a nonsmooth context.

References

- [1] L. Ambrosio and D. Trevisan. Well posedness of Lagrangian flows and continuity equations in metric measure spaces. *ArXiv e-prints*, February 2014.