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Geodesic jumps in non-continuous SDE: applications to an averaging principle on foliated space

Abstract

Semimartingales with jumps have been treated among others, by Kurtz, Pardoux and Protter, 1995, using the so called Marcus approach for jumps. Marcus interpretation describes the jumps as following an artificial deterministic flow of a vector field along a hidden time. Here we propose jumps of cadlag trajectories along geodesics, hence depending only on the point where the jumps start at. We get a generalized Itô-Kunita decomposition of the corresponding flow of local diffeomorphism and apply this approach to decomposition of flows and averaging along foliated manifolds.