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Strong solutions of SDEs with critical discontinuities in diffusion coefficients

We prove strong existence for Itô SDEs with diffusion coefficients that can introduce strong attraction to a submanifold. We extend and strengthen the Roeckner-Zhao approach, which uses Malliavin calculus to establish compactness of the approximating solutions in Wiener-Sobolev space. At least when the diffusion coefficients are sufficiently regular in time, this provides an alternative to Krylov's recent proof of strong existence via analysis of the Itô-Duhamel series. Joint work with Sallah Eddine Boutiah (Laval).