

Linearization and a superposition principle for deterministic and stochastic nonlinear Fokker-Planck-Kolmogorov equations

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Abstract. We prove a superposition principle for nonlinear Fokker-Planck-Kolmogorov equations on Euclidean spaces and their corresponding linearized first-order continuity equation over the space of Borel (sub-)probability measures. As a consequence, we obtain equivalence of existence and uniqueness results for these equations. Moreover, we prove an analogous result for stochastically perturbed Fokker-Planck-Kolmogorov equations. To do so, we particularly show that such stochastic equations for measures are, similarly to the deterministic case, intrinsically related to linearized second-order equations on the space of Borel (sub-)probability measures.

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