# A perturbation formula as universal tool for strong approximations of stochastic differential equations

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The main object of this talk is a pathwise perturbation formula for stochastic differential equations (SDEs) which expresses the distance between the solution and any Itô process in terms of the distances of the local characteristics. Together with suitable integrability properties, this is a convenient tool for proving strong convergence rates of various approximations of SDEs. For example, this yields a sufficient condition for local Lipschitz continuity in the strong sense in the initial value, a sufficient condition for explicit numerical approximations of finite-dimensional SDEs and a sufficient condition for spatial discretizations of nonlinear SPDEs. We illustrate these conditions with example SDEs from finance, physics and biology.

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