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## CHERNOFF APPROXIMATION OF DIFFUSIONS AND FURTHER APPLICATIONS.

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We discuss approximations of evolution semigroups with the help of the Chernoff theorem. We present different approaches to construct Chernoff approximations for semigroups, generated by Markov processes, and for Schrödinger groups. Chernoff approximations provide simultaneously numerical schemes for PDEs and pseudo-differential equations (in particular, the operator splitting method), can be understood as a numerical path integration method. Sometimes, Chernoff approximations provide also Euler–Maruyama schemes for the corresponding SDEs. We discuss Chernoff approximations for semigroups generated, e.g., by diffusions in domains of Euclidean spaces and Riemannian manifolds with either Dirichlet, or Robin boundary conditions; by subordinate diffusions in Euclidean spaces, on star graphs and Riemannian manifolds. The constructed Chernoff approximations for evolution semigroups can be used further to approximate solutions of some time-fractional evolution equations describing anomalous diffusion (solutions of such equations do not possess the semigroup property and are related to some non-Markov processes).

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