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Markov processes and generalized Schroedinger equations

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Starting from the forward and backward infinitesimal generators of bilateral, time-homogeneous Markov processes, the self-adjoint Hamiltonians of the generalized Schroedinger equations are first introduced by means of suitable Doob transformations. Then, by broadening with the aid of the Dirichlet forms the results of the Nelson stochastic mechanics, we prove that it is possible to associate bilateral, and time-homogeneous Markov processes to the wave functions stationary solutions of our generalized Schroedinger equations. Particular attention is then paid to the special case of the Levy-Schroedinger equations and to their associated Levy-type Markov processes, and to a few examples of Cauchy background noise.

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