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Stochastic quantization and the geometry of open quantum systems

In analogy with stochastic quantization of Euclidean QFT, a quantum Langevin equation associated with the spectral action is sought. For Gaussian type test functions, the Evans-Hudson quantum stochastic differential equation provides a candidate. The structure maps for the qSDE are constructed from the noncommutative Laplacian and live on a space over noncommutatuve differential forms similar to the commutative setting. This motivates viewing a canonical open quantum system as a noncommutative Wiener space and relating the noncommutative Laplacian of products of spectral triples to more general Lindbladians.