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Generators of Loewner chains with applications to certain noncommutative stochastic processes on the unit circle

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Abstract

Noncommutative unitary stochastic processes with monotone independent increments can be characterized by Loewner chains on the unit disk, having Denjoy-Wolff point at 0 and being continuous with respect to time parameter. From a probabilistic point of view, it is natural to look for a suitable notion of “generator” of a Loewner chain. However, because of lack of differentiability about time parameter, the standard method of differential equations is not available. In this talk, we define an integro-differential equation for Loewner chains, define a generator, and compare it with probability theory. Then the convergence of Loewner chains is fully characterized by the convergence of generators, paralleling to the case of additive processes in probability theory. The talk is based on: T. Hasebe and I. Hotta, Additive processes on the unit circle and Loewner chains, *Int. Math. Res. Not.* 2022, Issue 22, 17797-17848.