Stochastic processes and function spaces on local field

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Abstract:

Structural study on stochastic processes is largely depend on the language for the description of randomness. Since stochastic processes on non-Archimedean metric space can not be diffusions, every stochastic process can travel only on jump-by-jump basis in such an environment.

A lesson from study on stochastic processes on the Euclidean space says that structural grip on jump processes is more difficult than diffusions in general. This stems from the facts that one point can be instantly brought to another by jump, even though they are separated in a large distance, and that one may observe a similar outcome after a massive accumulation of very small jumps. In contrast, in non-Arichimedean metric space, any massive accumulation of very small jumps never bring the particle far away.

This structural gap between those two spaces does not prove obstacle to function spaces determined by stochastic processes on non-Arichimedean metric space. However, it is sometimes so significant that we can observe unique aspects on some function spaces on local fields.