Functional limit theorem for processes pieced together from excursions

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A sample path of a process can be constructed by being pieced together from excursions away from a prescribed point a. Itô's excursion theory assures that, for a strong Markov process where the point a is regular for itself, the point process of excursions is Poisson and hence is characterized by its characteristic measure called the *excursion measure*.

In [1], the author obtained some homogeneity results for jumping-in diffusion processes. The proof was based on the construction of a sample path from excursions and the functional convergence of the suitable scaling for the pieced process was proved via that for excursions.

In this talk, we provide a more general framework for proving convergence of the pieced process from that of excursions. We assume that the excursion measures considered are realized as pullback of a common measure by measurable maps and those maps converge in the function space. We then prove convergence of the pieced process in law on the Skorokhod space.

References

[1] K. Yano. Convergence of excursion point processes and its applications to functional limit theorems of Markov processes on a half-line. *Bernoulli*, 14(4):963–987, 2008.

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