DENIZ SEZER, University of Calgary, University of Calgary, 2500 University Drive NW, Calgary, Alberta, T2N 1N4, Canada
Conditioning Super-Brownian Motion on its boundary statistics and a class of "weakly" extreme X-harmonic functions

Let X be a super-Brownian motion (SBM) defined on $\mathbb{R}^n$ and (X_D) be its exit measures indexed by sub-domains of $\mathbb{R}^d$. We pick a bounded sub-domain D, and condition the super-brownian motion inside this domain on its "boundary statistics", random variables defined on an auxiliary probability space generated by sampling from the exit measure X_D. Among these, two particular examples are conditioning on a Poisson random measure with intensity βX_D, and X_D itself. We find the conditional laws as h-transforms of the original SBM law using X-harmonic functions.

The X-harmonic function H^ν corresponding to conditioning on $X_D = \nu$ is of special interest, as it can be thought as the analogue of the Poisson kernel. An open problem is to show that H^ν is extreme at least for some ν when D is a smooth domain. An equivalent problem is to show that the tail sigma field of SBM in D is trivial with respect to P^ν. We prove a weaker version of this result using an approximation, first by conditioning on a Poisson random measure with intensity nX_D and then letting n go to infinity. We show that for any A in the tail sigma field of X, $P^{X_D}(A) = 0$ or 1 almost surely.