FIXED POINTS AND HEAVY-TAILED EXTREME LEVEL SETS OF BRANCHING BROWNIAN MOTION

Arnab Chowdhury
(Tata Institute of Fundamental Research, Mumbai, India)

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In the first part of this talk, we discuss the fixed point problem of branching Brownian motion (BBM). We establish a complete characterization of the fixed points of BBM with critical and supercritical drifts assuming only that they are locally finite almost surely. In particular, we do not assume finite intensity or the finite top particle conditions. We also give a full characterization of the domain of attraction of the fixed points of BBM. Our approach combines the F-KPP equation and Bramson's ψ-estimate to analyze the Laplace functionals of BBM, together with a finer analysis based on a carefully designed Brownian thinning technique. This part is based on a joint work with Xinxin Chen, Atul Shekhar and Shuo Zhu. In the second part, we turn to the extreme level sets of BBM. We show that these level sets exhibit heavy-tailed behaviour, and we use this to establish a large-deviation result for their growth.