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Convergence of Systems of Stable Random Walks

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Abstract

A system of coalescing Brownian Motion starting at every point in the space-time plane is called the Brownian Web and was introduced by Fontes, Isopi, Newman and Ravishankar (2004). In the same paper they prove weak convergence to the Brownian Web under diffusive scaling of the system of simple symmetric one-dimensional coalescing random walks starting on each point in the space-time lattice \mathbb{Z}^2 . Later Newman, Ravishankar and Sun (2005) proved an invariance principle related to the Brownian Web, they established the convergence to Brownian web for systems of one-dimensional coalescing random walks under finite absolute fifth moment of the transition probability (allowing for crossing of paths unlike the nearest neighbor walks). Here we build a stable version of the Brownian Web or simply a "Stable Web" and also prove an invariance principle for it related to the convergence of a system of coalescing random walks in the domain of attraction of a stable law. This is a joint work with Thomas Mountford (EPFL) and Krishnamurthi Ravishankar (NYU).