

Scaling limits of large random trees

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We will present some of the recent progress on the description of large-scale structure of random trees, and discuss several applications, in particular to combinatorial trees, Galton-Watson trees, some models of phylogenetic trees, and dynamical models of randomly-growing trees.

In a first part, we will review the now classical results on the convergence of Galton-Watson trees conditioned to have a given, large number of vertices towards the so-called Brownian Continuum Random Tree, and more generally towards the stable Lévy trees. These results are due to the pioneer work of Aldous, published in a series of paper at the beginning of the 90s, and were then extended by Duquesne and Le Gall in the early 2000s. We will also present a series of properties of the stable Lévy trees.

In a second part, we will more generally focus on sequences of trees that satisfy a certain Markov branching property, which appears naturally in a large set of models, including conditioned Galton-Watson trees. The continuous trees appearing as scaling limits are the so-called "fragmentation trees". This class of trees is related to the fragmentation processes introduced and studied by Bertoin in the 2000s.