

大题目： Galton-Watson trees and Levy trees

第一部分： Local limits theory and pruning processes for Galton-Watson trees.

First, we will give a general presentation on local limit of Galton-Watson (BGW) trees conditioned to be large, where the limit is again a GW tree with a distinguished spine which is either infinite or finite. Second, some pruning procedures on trees will be introduced and applied to Galton-Watson trees. In this way, some tree-valued Markov processes and related cut trees are induced.

第二部分： From Galton-Watson trees to Levy trees: scaling limits and characterizations.

We show that Galton-Watson trees, suitably scaled, converge to a kind of continuum random trees, so-called Levy trees, whose characterizations will be also given. Then the tree-valued processes and cut trees introduced in the first part, suitably scaled, will be shown to converge to their continuum counterparts.

第三部分： Some applications of Levy trees to study branching processes.

Levy trees give the genealogy of continuous state branching processes. We shall use Levy trees to study the continuous state branching processes, including local limit and population structures. We will focus on quadratic case.