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Limit theorems for Markov processes indexed by continuous time Galton-Watson trees

We consider a continuous time Galton-Watson tree with a Markov process running along its branches. Non local branching is allowed, with possible jumps described by a Markov kernel. We prove a law of large numbers for the empirical measure of individuals alive at time t when t tends to infinity. This relies on a probabilistic interpretation of its intensity measure by mean of an auxiliary process. The latter has the same generator as the Markov process along the branches plus additional branching events, associated with jumps of accelerated rate and biased distribution. In the super-critical case for instance, this comes from the fact that by choosing an individual uniformly at time t , we favor lineages with more branching events and larger offspring. Some examples are carried as illustrations. This is a joint work with V. Bansaye, JF. Delmas and L. Marsalle.