COVER TIMES OF RANDOM WALKS ON SOME SPECIAL TREES

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In 1989, David Aldous gave a heuristic argument for deriving the scaling limit of the expected cover-and-return time to the root of the simple random walk on a uniform random labelled tree on n vertices. I will discuss work that, up to the particular value of the limit, confirms this result. Specifically, in a joint project with George Andriopoulos (NYU Abu Dhabi), Vlad Margarint (Charlotte) and Laurent Menard (Paris Nanterre), it was shown that the suitably-rescaled cover/cover-and-return times of simple random walks on critical, finite variance Galton-Watson trees converge in distribution with respect to their annealed laws to the cover/cover-and-return time of Brownian motion on the Brownian continuum random tree (CRT), as do the relevant moments. Other families of graphs that have the Brownian CRT as a scaling limit were also covered. If time permits, I will further present a conclusion concerning the cover times of random walks on binary trees. In the same 1989 paper as mentioned above, David Aldous derived the leading order asymptotics for the simple random walk in this setting. Similar (and indeed more refined) results have been obtained for the lambda-biased random walk (in which the probability of jumping to the parent vertex is lambda times the probability of jumping to a particular child) with lambda>=1. Complementing this, in the case when lambda<1, I will describe a scaling limit for the cover time, with the distributional limit being given in terms of a jump process on a Cantor set that can be seen as the asymptotic boundary of the tree.