

Large fringe and non-fringe subtrees in conditional Galton-Watson trees

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One particularly attractive random tree model is the tree chosen uniformly at random from a collection of trees. Many of these models are equivalent to the Galton-Watson tree conditional on its size – these trees, in turn, go back to the model proposed by Bienaymé, Watson and Galton for the evolution of populations.

We study the conditions for families of subtrees to exist with high probability (whp) in a Galton-Watson tree of size n . We first give a Poisson approximation of fringe subtree counts, which yields the height of the maximal complete r -ary fringe subtree. Then we determine the maximal K_n such that every tree of size at most K_n appears as a fringe subtree whp. Finally, we study non-fringe subtree counts and determine the height of the maximal complete r -ary non-fringe subtree.