Finding the seed of uniform attachment trees

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Abstract:
A uniform attachment tree is a random tree that is generated dynamically. Starting from a fixed "seed" tree, vertices are added sequentially by attaching each vertex to an existing vertex chosen uniformly at random. Upon observing a large (unlabeled) tree, one wishes to find the initial seed. We investigate to what extent seed trees can be recovered, at least partially. We consider three types of seeds: a path, a star, and a random uniform attachment tree. We propose and analyze seed-finding algorithms for all three types of seed trees.