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Power of k choices in the process of generating rainbow spanning trees in random graphs

We consider the (Erdős-Rényi) random graph process, which is a stochastic process that starts with n vertices and no edges, and at each step adds one new edge chosen uniformly at random from the set of missing edges. Let $G(n,m)$ be the graph with m edges obtained after m steps of this process. Each edge e_i $(i = 1, 2, \ldots, m)$ of $G(n,m)$ independently chooses precisely $k \in N$ colours, uniformly at random, from a given set of $n-1$ colours (one may view e_i as a multi-edge). We stop the process at the time M when the following two events hold: $G(n,M)$ is connected and every colour occurs at least once. The question is whether $G(n,M)$ has a rainbow (that is, multicoloured) spanning tree. Clearly, both properties are necessary for this property to hold.

In 1994, Frieze and McKay investigated the case $k=1$ and the answer to this question is "yes" (asymptotically almost surely). However, since the threshold for connectivity is $\frac{n}{2}\log n$ and the threshold for seeing all the colours is $\frac{n}{k}\log n$, $k=2$ is of special importance. This is a work in progress but I hope to announce that asymptotically almost surely the answer is "yes" also for $k \geq 2$.

(Joint work with Deepak Bal, Patrick Bennett, and Alan Frieze.)