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Vector multiplicative coalescent processes and mean minimal spanning trees of multipartite graphs

It is known that in certain cases, the cluster dynamics of a random graph process can be replicated with the corresponding random coalescent process. The cluster sizes of the coalescent process are reflected in an auxiliary process called the Marcus-Lushnikov process. On the other hand, the cluster sizes of the corresponding random graph process yield the mean length of minimal spanning trees with random edge lengths. This connection allows one to express the limiting mean length of minimal spanning trees in terms of the solutions of the Smoluchowski coagulation equations that represent the hydrodynamic limit of the Marcus-Lushnikov process. In this talk, I will present joint work on breaching the gap between the Smoluchowski coagulation equations for Marcus-Lushnikov processes and the theory of random graphs, concentrating on the case of regular and irregular multipartite graphs and deriving the limiting mean length of minimal spanning trees for these sequences of graphs.