

TITLE: "Horton self-similarity of coalescent trees"

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The session where the abstract should be considered: "Four paradigms in predicting extremes: Legacy of Vladimir I. Keilis-Borok"

ABSTRACT: We establish Horton self-similarity for a tree representation of Kingman's coalescent process. The proof is based on a Smoluchowski-type system of ordinary differential equations for the number of branches of a given Horton-Strahler order in a tree that represents Kingman's N -coalescent process with a constant kernel, in a hydrodynamic limit. We also demonstrate a close connection between the combinatorial Kingman's tree and the combinatorial level set tree of a white noise, which implies Horton self-similarity for the latter. Numerical experiments illustrate the results and suggest that Kingman's coalescent and a white noise also obey a stronger Tokunaga self-similarity.