CONTINUUM INHOMOGENEOUS RANDOM GRAPHS: CONSTRUCTION AND FRACTAL DIMENSIONS

Nicolas Broutin *INRIA-Paris, France*
Thomas Duquesne *Paris 6, France*
Minmin WANG *University of Bath, UK*, E-mail: wangminmin03@gmail.com

Abstract: Continuum inhomogeneous random graphs arise in the scaling limits of critical rank-1 inhomogeneous random graphs ([3], [4]). They are extensions of the continuum random graph introduced by Addario-Berry, Broutin & Goldschmidt [1] which has appeared as the scaling limit of the Erdős–Rényi graph in the critical window. In this talk, we present a construction of these graphs from the Lévy processes without replacement of Aldous & Limic [2]. In particular, this construction reveals a close connection between the clusters of the graphs and Lévy trees, which consists in an isometric embedding of the spanning trees of these clusters into Lévy trees. As a consequence of this construction, we deduce the Hausdorff dimension and the packing dimension of the graphs, based on a previous work of Duquesne & Le Gall [5], in this way confirming a conjecture of Bhamidi, van der Hofstad & Sen [3].

References

[1] L. Addario-Berry, N. Broutin & C. Goldschmidt (2012). The continuum limit of critical random graphs. *Probab. Theory Related Fields.* **152**, 367–406.

[2] D. Aldous & V. Limic (1998). The entrance boundary of the multiplicative coalescent. *Electron. J. Probab.* **3**, 1–59.

[3] S. Bhamidi, R. van der Hofstad & S. Sanchayan (2017+). The multiplicative coalescent, inhomogeneous continuum random trees, and new universality classes for critical random graphs, *Probab. Theory Related Fields (to appear).*

[4] N. Broutin, T. Duquesne & M. Wang (2017+). Lévy trees and continuum limits of critical inhomogeneous random graphs. *In preparation.*

[5] T. Duquesne & J.-F. Le Gall (2005). Probabilistic and fractal aspects of Lévy trees. *Probab. Theory Related Fields.* **131**, 553–603.