ID de Contribution: **3** Type: **Non spécifié**

Phase transition for block-weighted random planar maps

mercredi 15 novembre 2023 16:30 (30 minutes)

Maps come with different shapes, such as trees or triangulations with many more edges. Many classes of maps have been enumerated (2-connected maps, trees, quadrangulations…), notably by Tutte, and a phenomenon of universality has been demonstrated: for the majority of them, the number of elements of size n in the class has an asymptotic of the form k 1/(r^n n^(5/2)), for a certain k and a certain r. Nevertheless, there are classes of degenerate" maps whose behaviour is similar to that of trees, and whose number of elements of size n has an asymptotic of the form k/(r^n n^(3/2)), as for example outerplanar maps. This dichotomy of behaviour is not only observed for enumeration, but also for metrics. Indeed, in thetree" case, the distance between two random vertices is in n^(1/2), against n^{1/4} for uniform planar maps of size n. This work focuses on what happens between these two very different regimes. We highlight a model depending on a parameter u>0 which exhibits the expected behaviours, and a transition between the two: depending on the position of u with respect to u_C, the behaviour is that of one or the other universality class. More precisely, we observe a subcritical" regime where the scale limit of the maps is the Brownian map, asupercritical" regime where it is the Brownian tree and finally a critical regime where it is the 3/2-stable tree. The results are obtained using a robust method, which can be used to study a variety of similar models

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