Chapuy, Guillaume

On tessellations of random maps and the $t_g$-recurrence. (English) Zbl 1427.60021

Summary: We study the masses of the two cells in a Voronoï tessellation of the Brownian surface of genus $g \geq 0$ centered on two uniform random points. Making use of classical bijections and asymptotic estimates for maps of fixed genus, we relate the second moment of these random variables to the Painlevé-I equation satisfied by the double scaling limit of the one-matrix model, or equivalently to the "$t_g$-recurrence" satisfied by the constants $t_g$ driving the asymptotic number of maps of genus $g \geq 0$. This raises the question of giving an independent probabilistic or combinatorial derivation of this second moment, which would then lead to new proof of the $t_g$-recurrence. More generally we conjecture that for any $g \geq 0$ and $k \geq 2$, the masses of the cells in a Voronoï tessellation of the genus-$g$ Brownian surface by $k$ uniform points follows a Dirichlet(1,1,\ldots,1) distribution.

MSC:

60D05 Geometric probability and stochastic geometry
05B45 Combinatorial aspects of tessellation and tiling problems

Keywords:
tessellations; random maps; Painlevé-I equation

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References:


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