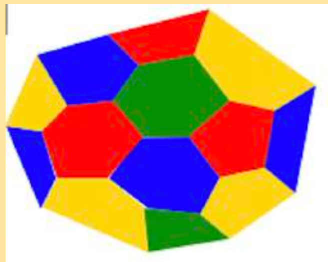
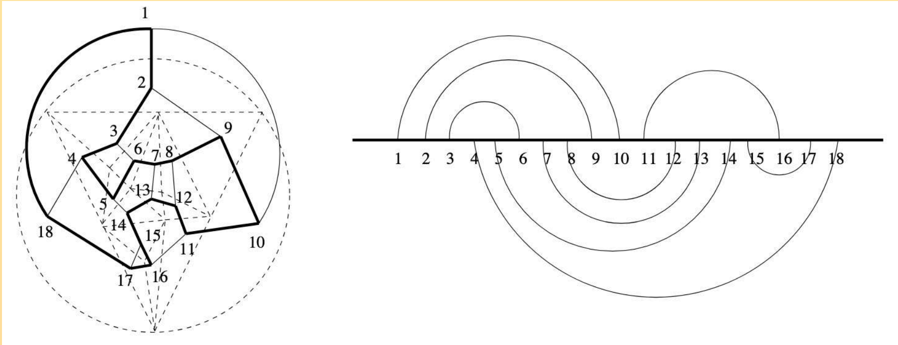
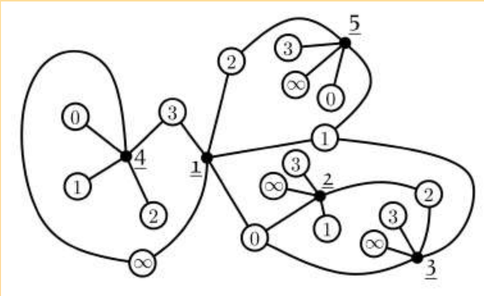
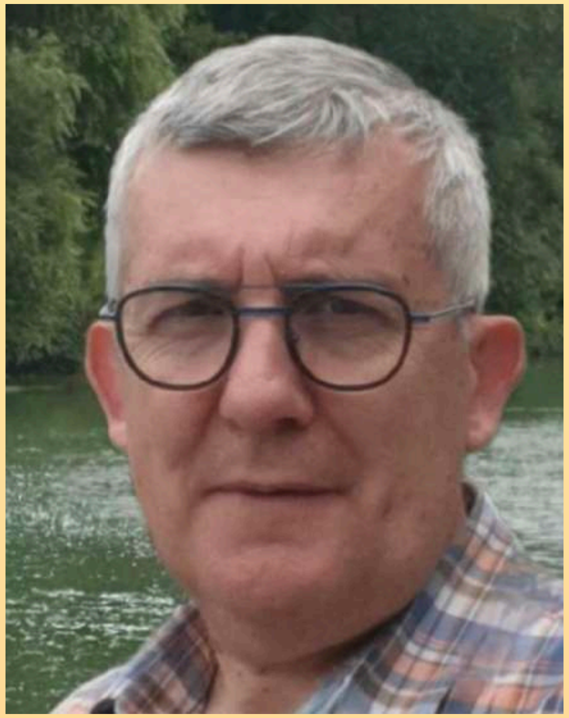
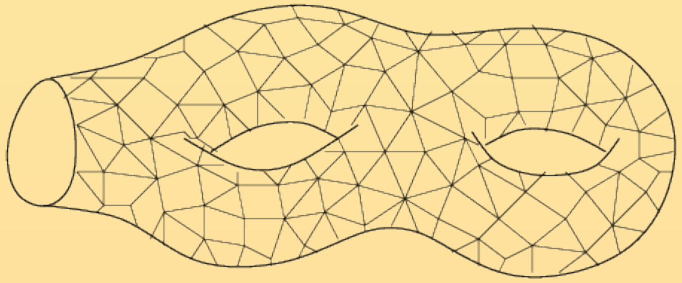
Meandering through random cycles and random colorings around Emmanuel











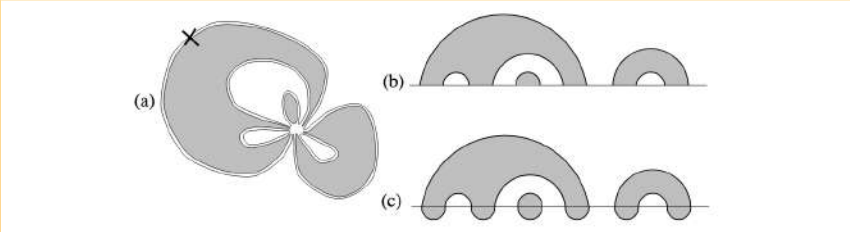


Fig. 3: Equivalence between (a) a bi-colored fatgraph with a unique vertex and a marked edge, (b) a system of bi-colored arches and (c) a system of arches closed into a set of connected circuits

B. Eynard,
IPHT CEA Saclay, CRM Montréal

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Coloring Random Triangulations

P. Di Francesco*,

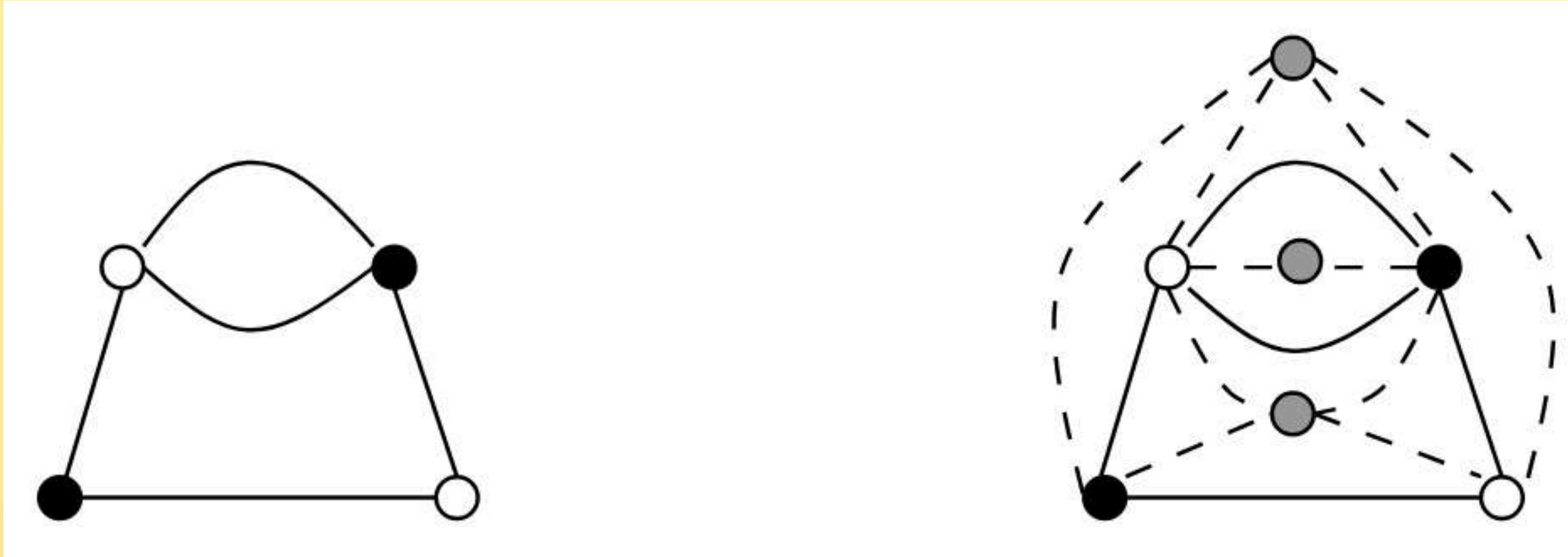
Department of Mathematics,
University of North Carolina at Chapel Hill,
CHAPEL HILL, N.C. 27599-3250, U.S.A.

B. Eynard#

Department of Mathematical Sciences,
University of Durham, Science Labs,
South Road, DURHAM DH1 3HP, U.K.

E. Guitter$

Service de Physique Théorique,
C.E.A. Saclay,
F-91191 Gif sur Yvette Cedex, France



Nucl. Phys., B 516, No. 3, 543-587 (1998).

Random matrix integral : $Z = \int dA\ dB\ e^{-N \,\mathrm{Tr}\, p \log(1-A) + q \log(1-B) + gAB}$

The free energy is easily obtained from (4.31) by expanding the resolvent (4.35) up to the second order in $1/\alpha$. We find

$$\boxed{t\partial_t f(p,q,z;t) \;=\; \Omega_2 - \frac{z^2}{2} \;=\; \frac{U_1U_2U_3}{t^2}(1-U_1-U_2-U_3)} \qquad (4.49)$$

Note that this is explicitly symmetric in p, q, z as expected.

Hamiltonian Cycles on a Random Three-coordinate Lattice

B. Eynard[1]

Department of Mathematical Sciences
University of Durham, Science Labs. South Road
Durham DH1 3LE, UK

E. Guitter[2]
Service de Physique Théorique de Saclay
F-91191 Gif-sur-Yvette Cedex, France

C. Kristjansen[3]

The Niels Bohr Institute
Blegdamsvej 17, DK-2100 Copenhagen Ø, Denmark

Nucl. Phys., B 528, No. 3, 523-532 (1998).

5 Conclusion

We have solved the non-trivial combinatorial problem of determining the number of spherical triangulations consisting of $2v$ triangles and being densely covered by a single self-avoiding and closed walk. Let us define the entropy exponent of such objects ω_H, as

$$\log \omega_H = \lim_{v\to\infty} \frac{1}{2v} \log\left(\mathcal{N}_0^{(1)}(2v)\right). \tag{5.1}$$

From (3.5) we see that

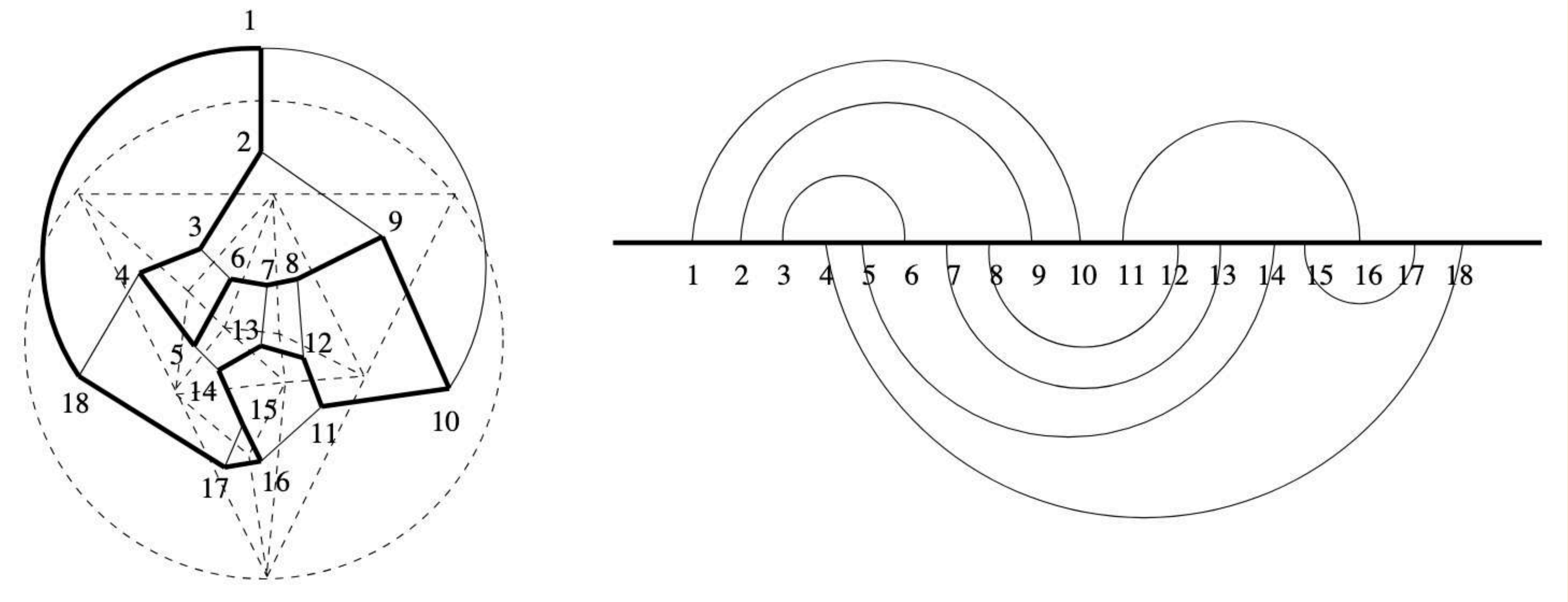
$$\omega_H = 4. \tag{5.2}$$

For triangulations without decorations the corresponding exponent takes the value [17]

$$\omega_H^{(T)} = 2 \cdot 3^{3/4} \tag{5.3}$$

and for triangulations corresponding to one-particle-irreducible three-coordinate graphs

$$\omega_H^{(1PI)} = \frac{16}{3\sqrt{3}}. \tag{5.4}$$



Counting mobiles by integrable systems

M. Bergère[1] , *B. Eynard*[12] , *E. Guitter*[1] , *S. Oukassi*[1]

[1] Université Paris-Saclay, CEA, CNRS, Institut de physique théorique
91191 Gif-sur-Yvette, France.

[2] CRM Centre de Recherches Mathématiques de Montréal, QC, Canada.

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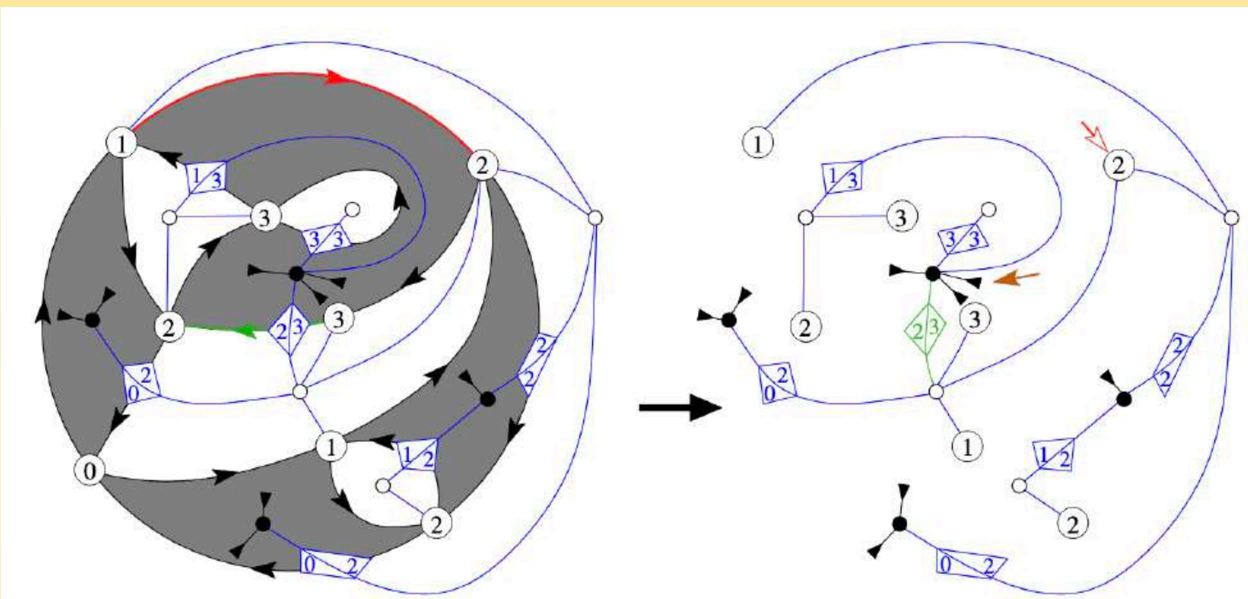

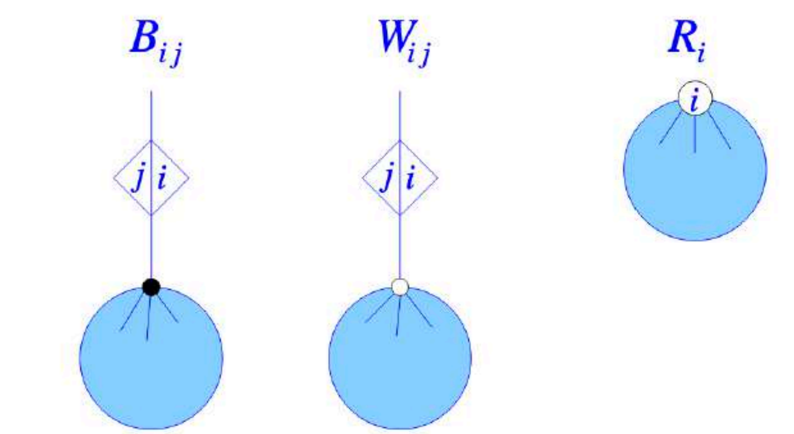

Figure 5: Schematic picture of a black half-mobile enumerated by B_{ij}, a white half-mobile enumerated by W_{ij} and a mobile with a marked corner (or a single labeled vertex), as enumerated by R_i.

Theorem 4.3 (Main theorem) *Assume $g_1 = \tilde{g}_1 = 0$ and g_k, $\tilde{g}_k$ as in eq (4.75). Then the semi-infinite matrices Q and P whose elements are given by the scalar products*

$$Q_{n,m} =< \phi_m(z), X(z)\psi_n(z) > \quad , \quad P_{n,m} =< \phi_m(z), Y(z)\psi_n(z) > , \quad n, m \geq 0, \tag{4.76}$$

are the solution to the combinatorial mobile problem. In particular, we have the expression

$$R_n = R \, \frac{h_{n-1}h_{n+1}}{h_n^2}, \quad h_n = \det_{1\leq a,b\leq N} \left(\bar{w}_a^{n+b} - w_a^{n+b} \right). \tag{4.77}$$

Merci Emmanuel