Random geometries and Tensor Field Theories

Under the supervision of Vincent Rivasseau

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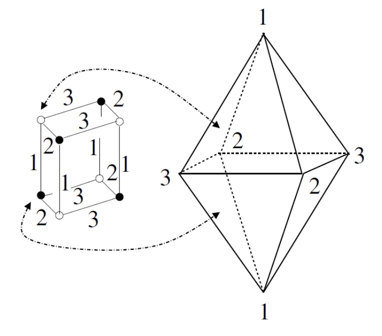

Journée des entrants du pôle théorie

IJClab, 1st December, 2021

Context : Random tensors and tensor field theory

Generalizing random matrices in $2D$, random tensors provide a probability measure on discrete geometries in any dimension $D \geq 3$, weighted by a discrete version of Einstein-Hilbert action, hence could by a way to quantize gravity.

Tensorial Feynman graph and in correspondence with simplicial geometries, vertices corresponding to polyhedra and edges to the gluing of two polyhedra along their commune face.

To explore the space of theories, one can promote random tensors to tensor field theories (non local QFT), and study their renormalization group flow.

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How to compute quantities in QFT ? The perturbative expansion $\longrightarrow$ divergente

Constructive QFT : one wants to prove the existence of the measure, that is to say for instance the analyticity of the correlation functions in the coupling constant.

There are several ways to do so : expanding the partition function in some constructive way, stochastic quantization...

The construction of tensorial field theories is interesting because some of them are renormalizable and asymptotically free.

What I am interested in : constructive tensorial field theory

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Thank you for your attention !