Séminaire des doctorants du LPTHE

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Solving Schwinger-Dyson equation: from Hopf algebra to perturbation theory

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Although Schwinger-Dyson equation comes from perturbation theory, it carries information about the non-perturbative regime of the theory. We will see how algebraic properties of QFT help to solve it. I will start by recalling some algebraic structures to introduce the Hopf algebra of Feynman graphs. The renormalisation group is seen as a one-dimensional subgroup of the character group of this Hopf algebra. Then I will define the Schwinger-Dyson equation of the massless Wess-Zumino model. The asymptotic behavior of the solution will be found which will provide a simplifying ansatz. This ansatz will allow us to solve the Schwinger-Dyson equation at higher order.