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## Diagrammatic Monte-Carlo algorithms for large- $N$ quantum field theories from Schwinger-Dyson equations

*Friday, 17 July 2015 15:00 (20 minutes)*

I present a general framework for constructing Diagrammatic Monte-Carlo algorithms for large- $N$  quantum field theories, which is based on the stochastic solution of the full untruncated hierarchy of Schwinger-Dyson equations and is an extension of the approach proposed in arXiv:1104.3459, arXiv:1009.4033. The algorithms are capable of constructing both weak- or strong-coupling expansions which are convergent at large  $N$  and asymptotic  $1/N$  expansions. We illustrate the application of the algorithm on the examples of the planar  $\phi^4$  theory,  $U(N)$  sigma model and strong-coupling QCD in the Veneziano limit at finite density. In the latter cases of lattice field theories with  $U(N)$  degrees of freedom, simulations in the weak-coupling regime are hindered by a sign problem. We discuss possible ways to overcome these problems, e.g. using the “bold” diagrammatic Monte-Carlo.

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