Large N Limit of the $O(N)$ Linear Sigma Model via Stochastic Quantization

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Abstract

In this talk we introduce the stochastic quantization of the $O(N)$ linear sigma model over $\mathbb{T}^d$. We study the large N limits of the dynamical $O(N)$ linear sigma model. We discuss uniform in N bounds on the dynamics and apply them to derive a suitable mean-field limit. Furthermore, we show that for sufficiently large mass, large N limits of the $O(N)$ linear sigma model are Gaussian free field. This talk is based on joint work with Hao Shen, Scott Smith and Xiangchan Zhu.