

The Stochastic Quantization Equations on the 2-dimensional torus Existence of Invariant Measures

Abstract

Consider the Stochastic Quantization Equation on the 2-dimensional torus formally given by

$$\begin{cases} \partial_t X &= \Delta X - \sum_{k=0}^n a_k X^k + \xi \\ X(0, \cdot) &= X_0 \end{cases} ,$$

where ξ is a space-time white noise, n is odd and $a_n > 0$. It is known that the above equation admits a well-posed theory only as a renormalized problem. We discuss how such an equation provides Markov solutions (evolving in a space of distributions of negative regularity close to zero) that are homogeneous in time and we prove existence of invariant measures for the Markov semigroup based on strong a priori bounds.