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How to determine the law of the solution to a stochastic partial differential equation driven by a Lévy space-time noise?

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We consider a stochastic partial differential equation on a lattice $\partial_t X = (\Delta - m^2)X - \lambda X^p + \eta$, where η is a space-time Lévy noise. A perturbative (in the sense of formal power series) strong solution is given by a tree expansion, whereas the correlation functions of the solution are given by a perturbative expansion with coefficients that are represented as sums over a certain class of graphs, called Parisi-Wu graphs. The perturbative expansion of the truncated (connected) correlation functions is obtained via a linked cluster theorem as sums over connected graphs only. The moments of the stationary solution can be calculated as well. In all these solutions the cumulants of the single site distribution of the noise enter as multiplicative constants. To determine them, e.g., by comparison with an empirical correlation function, one can fit these constants (e.g., by the methods of least squares) and thereby one (approximately) determines laws of the solution and the driving noise. © *2007 American Institute of Physics*. [DOI: 10.1063/1.2712916]

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