

A Lattice Study of Renormalons in Asymptotically Free Sigma Models

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In general, perturbative expansions of observables in quantum field theories are divergent (asymptotic) series. It is often possible to apply resummation techniques to assign a unique finite value to the asymptotic series, but a particular pattern of divergence, the so-called renormalon, gives rise to non-perturbative ambiguities. The framework of numerical stochastic perturbation theory (NSPT), based on stochastic quantisation and the Langevin equation, allows us to compute the coefficients of perturbative expansions up to very high orders (>40) on the lattice. In this talk we present first results for an NSPT study of asymptotically free sigma models and discuss possible renormalon signatures in the expansion of the energy density.

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