

Fourier acceleration, the HMC algorithm and renormalizability

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The analysis of the Hybrid Monte Carlo (HMC) algorithm developed by Luscher and Schaefer is generalized to include Fourier acceleration. We show for the ϕ^4 theory examined by Luscher and Schaefer that Fourier acceleration removes the non-renormalizable, singular behavior which they discovered and likely defines a renormalizable theory for the five-dimensional correlation functions in Euclidean space and Monte Carlo time.

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