

Abstract Submitted
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Renormalization group method for predicting frequency clusters in a chain of nearest-neighbor Kuramoto oscillators. OLEG KOGAN, GIL REFAEL, MICHAEL CROSS, Caltech, JEFFREY ROGERS, Caltech, HRL, CALTECH CONDENSED MATTER TEAM — We develop a renormalization group (RG) method to predict frequency clusters and their statistical properties in a 1-dimensional chain of nearest-neighbor coupled Kuramoto oscillators. The intrinsic frequencies and couplings are random numbers chosen from a distribution. The method is designed to work in the regime of strong randomness, where the distribution of intrinsic frequencies and couplings has long tails. Two types of decimation steps are possible: elimination of oscillators with exceptionally large frequency and renormalization of two oscillators bonded by a very large coupling into a single one. Based on these steps, we perform a numerical RG calculation. The oscillators in the renormalized chain correspond to frequency clusters. We compare the RG results with those obtained directly from the numerical solution of the chain's equations of motion.

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