Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Fixed point of a renormalization group approach for oscillator synchronization TONY LEE, GIL REFAEL, MICHAEL CROSS, OLEG KOGAN, Department of Physics, California Institute of Technology, JEFFREY ROGERS, Control and Dynamical Systems, California Institute of Technology — We apply a recently developed renormalization group method to a 1-dimensional chain of phase-coupled oscillators in the regime of weak randomness. The RG predicts how oscillators with randomly distributed frequencies and couplings form frequency-synchronized clusters. Although the RG was originally intended for strong randomness (distributions with long tails), we find good agreement with numerical simulations even in the regime of weak randomness. We also show analytically and numerically the existence of a stable fixed point in the functional RG space. At late stages of the RG, there is a universal approach to the fixed point regardless of the initial distributions of frequency and coupling.

Oleg Kogan
California Institute of Technology

Date submitted: 21 Nov 2008 Electronic form version 1.4