



Lothar-Collatz-Kolloquium über Angewandte Mathematik

Donnerstag, den 16. April 2026, um 14:30 Uhr, im Hörsaal 6

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Hidden Networks: From Phase Reductions to Effective Network Interactions

Zusammenfassung/Abstract:

From networks of interconnected neurons in the brain to coupled electrochemical reactions: The collective dynamics of interacting dynamical systems shape the function (or dysfunction) of many systems that are critical for our everyday lives. For coupled oscillatory processes, synchronization is a prime example of emergent collective dynamics. But how oscillators interact is not necessarily obvious from (physical) connections between the oscillators. Here we look at phase reductions as a way to uncover the hidden 'effective' network interactions for coupled oscillators dynamics. On the one hand, these give insight into when oscillators do and do not interact (despite a physical link). On the other hand, they elucidate when and how nonpairwise higher-order interactions shape synchronization phenomena in coupled oscillator networks.

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