

Donnerstag
17.10. um 16 Uhr
Studentinnen/Studenten
sind herzlich willkommen

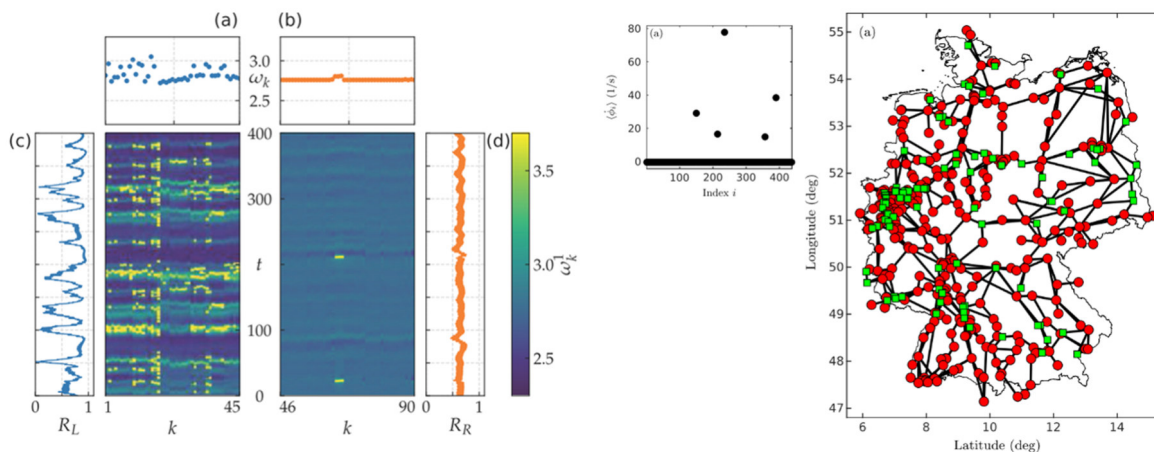
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Synchronization Scenarios in Complex Networks: from Brain Dynamics to Power Grids

Thursday, October 17th, 2024, at 4.00 p.m. c.t.
Building C6.4, Lecture Hall II

Synchronization in dynamical networks of nonlinear oscillators is common in both natural and technological systems. This review explores synchronization in networks with static or adaptive coupling, highlighting power grids, neuronal networks with synaptic plasticity, and physiological networks. Chimera states, which feature coexisting synchronized and desynchronized regions, are discussed. The study shows that complex synchronization patterns emerge when considering coupled phase and amplitude dynamics, complex network topologies, and time-delayed coupling. These patterns are relevant to phenomena like epileptic seizures, unihemispheric sleep, and cognitive functions.

Additionally, the talk presents power grids as adaptive networks where coupling weights evolve through feedback, similar to neuronal networks. This approach helps transfer insights from neuronal networks to power grids, particularly regarding the formation of solitary states and multifrequency clusters, which can destabilize complete synchronization.



Left: Partial synchronization pattern modeling unihemispheric sleep with low and high degree of synchronization in the left ((a), (c)) and right ((b), (d)) hemisphere, respectively. Right: Partial synchronization pattern: Mean phase velocity for each node in the German power grid network presented in right panel.

Philipp Hövel takes care of the speaker.

You can participate online via TEAMS: <https://tinyurl.com/schoell1710>

Interested people are cordially invited.

Coffee and cookies are served at 4.00 p.m. in front of the Lecture Hall