SOE 2: Invited Talk: Dynamics of Networks (joint session DY/SOE)

Time: Monday 12:30–13:00 Location: ZEU 250

Invited Talk SOE 2.1 Mon 12:30 ZEU 250

Novel phenomena and analysis methods in oscillator networks: higher-order interactions, higher-order averaging, and inference — •Hiroshi Kori — The University of Tokyo, Japan

Synchronization of oscillator networks is essential for functionalization of systems. Examples include heart pacemaker, circadian clock, and locomotion, to name a few. In this talk, after reviewing a general background, I will present recent studies with an emphasis on novel phenomena and analysis techniques. (i) A network of three oscillators shows complex synchronization transitions when the network structure or overall coupling intensity is varied [1]. The transition is analyzed using a higher-order averaging method. (ii) In the assembly of noisy oscillators with a three-body interaction, synchronized state appears only transiently and its persistent time increases exponentially with the interaction strength of three-body coupling. (iii) I will present our proposed inference methods of coupling intensity from spike data [2] and the phase from oscillatory time series [3].

[1] M. Kato, H. Kori, PRE (2023)
[2] F. Mori and H. Kori, PNAS (2022)
[3] A. Matsuki, H. Kori, R. Kobayashi. arXiv (2022)