

Computing Phase Dynamics in Delay–Coupled Oscillators

Babette de Wolff

Universität Hamburg, Germany
BABETTE.DE.WOLFF@UNI-HAMBURG.DE

Abstract

Network interactions between coupled oscillator units are often subject to time delays, since signals travel at finite speed from one node to another. Motivated by this, I will discuss a higher-order *phase reduction* method – i.e. a method to derive equations for the phases of coupled oscillators – for networks systems with delayed coupling. The resulting phase equations are finite dimensional, which makes them in particular suitable for a further (numerical) analysis.

In the talk, I will first discuss the dynamical systems approach behind the phase reduction method; next, I will discuss how one can compute such a phase reduction numerically, thus making it a starting point of further numerical analysis of synchronisation and bifurcation behaviour. This is based upon joint work with Christian Bick and Bob Rink [1] and upon currently ongoing work with Kyle Wedgwood.

References

- [1] Christian Bick, Bob W. Rink and Babette A. J. de Wolff, *Higher-order phase reduction for delay-coupled oscillators beyond the phase-shift approximation*, arxiv preprint