Seminarium Zespołu Matematyki Obliczeniowej

W dniu 14 stycznia 2020 r. (wtorek) o godz. 12:00
w sali 303 (w łączniku A3-A4)

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wygłosi referat pt.

Spectral Causality Model with Applications to Brain Signals

Serdecznie zapraszamy!

Abstract: The first part of the talk will be background information on the various spectral measures of dependence in a network of brain signals. There is no one measure that can completely characterize dependence between signals in a network. Here, our focus will be on characterizing dependence through their various oscillatory components. We give an overview of coherence, partial coherence, dual-frequency coherence and the time-evolving dual-frequency coherence. One limitation of these measures is that they do not give information about causality, that is, it they do not quantify the amount of variation in a channel that is explained by past activity of another channel. One way to approach this is by fitting a vector autoregressive (VAR) model. Under the VAR model, one can derive frequency-based directed measures such as partial directed coherence. One limitation of examining directionality through the classical VAR model is that it constrains the lead-lag dependence across different frequency bands to be the same. In this talk we will demonstrate why this can be problematic and then propose a spectral vector autoregressive model that allows us to examine directed dependence between oscillatory activity at different frequency bands. The model will be illustrated on electroencephalograms and the analysis will highlight some of the interesting lead-lag dependence between oscillations.
This is joint work with Chee-Ming Ting and Marco Pinto.