

Abstract Submitted
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Measuring the direction of coupling between biological oscillators¹ JORGE BREA, Department of Physics and Astronomy, University of Missouri Saint Louis , ALEXANDER NEIMAN, Department of Physics and Astronomy, Ohio University, DAVID RUSSELL, Department of Biological Sciences, Ohio University — The electroreceptor system of the paddle fish comprises two self-sustained noisy oscillators: one oscillator resides in the sensory epithelium and is coupled through excitatory synapse with another oscillator residing in the afferent neuron terminal. We test recently developed algorithms for estimating the directionality of their coupling from experimental recordings of spontaneous and stimulated activity. These experimental bivariate time series are structurally different: while the signal from the epithelial oscillations is represented by a continuous stochastic process, the neuron oscillations are represented by a stochastic point process. We show that the tested algorithms detect reliably directionality of coupling both in experimental and simulated data and can be used for physiologically relevant short segments of data.

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