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Phase models with time delay

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Abstract

We consider a network of neurons with time delayed connections where the neurons are inherently oscillatory. We show how this may be reduced to a phase model network and how the time delay enters into the reduced model. For the case of two neurons, we show how the time delay may affect the stability of the periodic solutions, leading to stability switching between synchronous and antiphase solutions as the delay is increased. Results for type I and type II oscillators are compared.

This is joint work with Andrew Smith and Ilya Kobelevskiy.