
SUE ANN CAMPBELL, University of Waterloo

Phase Models with Time Delay

Coupled oscillators are ubiquitous in nature and engineering, and have been a focus of intense mathematical study for over 300 years, since Huygens noticed that two pendulum clocks hung on the same wall would begin to run in perfect synchrony. Major questions still remain unanswered, however. In this talk we will consider coupled oscillators consisting of a network of neurons with time delayed connections. 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 solution leading to stability switching between synchronous and antiphase solutions as the delay is increased. Results for oscillators with different characteristics are compared.

This is joint work with Andrew Smith and Ilya Kobozevskiy.