

TIME DELAY SYSTEMS

Webinar

$$\dot{x}(t) = A(t)x(t) + \int_{-\sigma}^{\tau} W(\vartheta, t)u(t + \vartheta) d\vartheta + \sum_{j=1}^g P_j(t)u(t - \tau_j(t))$$

TDS

2025

Time Delays, Hopf Bifurcation and Synchronization



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June 13, 2025, Friday @ 4:00 pm (CET)

7:00 am (PDT), 10:00 am (EDT), 10:00 pm (CST)

Event will take place via Zoom

ABSTRACT: We consider networks of oscillator nodes with time delayed, global circulant coupling. We first study the existence of Hopf bifurcations induced by coupling time delay, and then use symmetric Hopf bifurcation theory to determine how these bifurcations lead to different patterns of phase-locked oscillations. We apply the theory to a variety of systems inspired by biological neural networks to show how Hopf bifurcations can determine the synchronization state of the network. We show how the network structure can influence the existence of co-dimension two double Hopf bifurcations which in turn affects whether the nodes synchronize.

BIO: Sue Ann Campbell received the BMath degree from the University of Waterloo and the PhD from Cornell University. Following her studies, she held positions as a postdoctoral researcher at the University of Montreal and as an Assistant Professor at Concordia University in Montreal, before returning to the University of Waterloo, where she is currently a Professor of Applied Mathematics and Associate Dean of Research for the Faculty of Mathematics. Her research interests include the study of delay differential equations and their application to models in biology and neuroscience.



Questions? Contact: Gabor Orosz, orosz@umich.edu