



The University of Western Ontario

Faculty of Science

Department of Applied Mathematics

APPLIED MATHEMATICS COLLOQUIUM

Date: Monday, November 3, 2008

Time: 2:30 pm

Location: Middlesex College, Room 204

Stability Switches and Hopf Bifurcations in a Pair of Delay Coupled Oscillators

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Abstract:

We consider a pair of delay-coupled limit cycle oscillators. Regarding the arithmetical average of two delays as a parameter, we investigate the effect of time delays on its dynamics, show that there exist stability switches for time delays under certain conditions, which do not occur for the corresponding coupled system without time delays. We give detailed and specific conditions determining the amplitude death for different delays. On the other hand, we also investigate Hopf bifurcations induced by time delays using the normal form theory and center manifold reduction. In the region where the stability switches may occur, we can not only specifically determine the direction of Hopf bifurcations but also show the bifurcating periodic solutions are orbitally asymptotically stable. Numerical simulation results are also given to support the theoretical predictions.