

APPLIED MATHEMATICS COLLOQUIUM

Date: Wednesday, September 23, 2015

Time: 2:30 – 3:30 p.m.

Location: Middlesex College Room 204

Complex Dynamics in Biological Systems due to Multiple Limit Cycle Bifurcation

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Abstract:

In this talk, we first present a brief introduction of the well-known Hilbert's 16th problem and bifurcation theory of limit cycles, and then discuss an application of the theory to biological systems. We will use 2-dimensional predator-prey systems to show that one, two, or even four limit cycles can bifurcate from a singular point. This may provide a scenario to explain certain complex dynamical behaviors of biological systems, which could be generated by bifurcation of multiple limit cycles. These complex behaviors include bistable or even tristable phenomenon which can cause co-existence of equilibrium states and oscillating motions. Such analysis may be useful for studying certain real biological systems.