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*Bifurcation of limit cycles in predator-prey models, canard cycles and Hilbert's 16th problem*

In this talk, I will start with predator-prey system to present the limit cycles and their bifurcations, including canard cycles and their cyclicity as well as fast-slow dynamics. I will then use the predator-prey system to reveal the two types of mechanisms of fast-slow dynamics in mathematical biology. In the end, I will connect the finiteness part of Hilbert's 16th problem, to explain the difficulties in dealing with the finite cyclicity of a degenerate degenerate graphics, the last challenge towards the proof of the finiteness part of Hilbert's 16th problem.