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A GEOMETRICAL APPROACH FOR STUDYING A CANARD EXPLOSION UN A PREDATOR-PREY MODEL

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In this talk, we propose a synthesis of methods in the theory of dynamical systems involving several time scales and provide recent applications in ecology and environmental sciences. We focus on a particular example, a well-known predator-prey model, where the dynamics of the predator is assumed to be much slower than that of the prey. We apply geometrical singular perturbation theory to analyse the Hopf bifurcation which leads to a Canard phenomenon. We explain how the blowing-up technique allows to desingularise the fold point in the phase space, and to show the canard explosion The method is overall general and can be applied to many other examples, but some aspects are specific and need to be adapted to other situations. We will also provide some results on the effect of random noise on some properties of our systems and the implication of the results on time-series analysis will be discussed.

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