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Complex Bifurcations of a Predator-Prey System with Allee Effect

In this talk, we present a study on a predator-prey system with strong Allee effect in the prey growth. The stability analysis of the model is carried out, and a comprehensive bifurcation analysis is presented. By a hierarchical parametric analysis, explicit stability conditions are obtained in terms of the system parameters. In particular, it is proved that this model can exhibit codimension-5 Hopf bifurcation and codimension-4 Bogdanov-Takens bifurcation, showing much more complex dynamical behaviours compared to the system without the Allee effect.