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Complex dynamics in an eco-epidemiological model

In this talk, we incorporate a disease on a predator in a Holling type II predator-prey model. We establish that the disease can have a stabilising effect on the system, bringing predator-prey oscillations to coexistent equilibrium. However, results become complex when disease dynamics are much faster than the predator-prey dynamics, i.e. for high transmission and disease-induced death rates. Numerical solutions indicate the existence of saddle-node and subcritical Hopf bifurcations, as well as turning points and branching in periodic solutions. This means that there are regions of bistability, in which the disease can have both a stabilising and destabilising effect. This holds for both density-dependent and frequency-dependent transmission.