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On a predator-prey system with digestion delay and anti-predation strategy

In this talk, I will present a predator-prey model incorporated with both cost and benefit from the prey's anti-predation response, together with a time delay in the transfer of biomass from the prey to the predator after predation. The model is a system of delay differential equations (DDEs). By analyzing this nonlinear DDE system, we obtain some insights on how the anti-predation response level (indirect effect) and the biomass transfer delay jointly affect the population dynamics; particularly we show how the nonlinearity in the predation term mediated by the fear effect affects the long term dynamics of the model system. These results seem to suggest a need to revisit some existing predator-prey models in the literature by incorporating the indirect effect and biomass transfer delay.