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Pattern formation in the Holling-Tanner predator-prey model with prey-taxis

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The pioneering work on the Lotka-Volterra model gave rise to rich literature on the interaction of two or more species.

In this paper, the pattern formation in the Holling-Tanner predator-prey model with prey-taxis is investigated theoretically and numerically. We first summarise the qualitative properties of the model where a threshold for the appearance of pattern formation is specified. We construct a dynamically consistent nonstandard finite difference scheme for the proposed model. Numerical simulations are provided to support our findings.

Keywords: Holling-Tanner predator-prey model, pattern formation, nonstandard finite difference scheme