عنوان مقاله:

Discretization of a fractional order ratio-dependent functional response predator-prey model, bifurcation and chaos

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خلاصه مقاله:

This paper deals with a ratio-dependent functional response predator-prey model with a fractional order derivative. The ratio-dependent models are very interesting, since they expose neither the paradox of enrichment nor the biological control paradox. We study the local stability of equilibria of the original system and its discretized counterpart. We show that the discretized system, which is not more of fractional order, exhibits much richer dynamical behavior than its corresponding fractional order model. Specially, in the discretized system, many types of bifurcations (transcritical, flip, Neimark-Sacker) and chaos may happen, however, the local analysis of the fractional-order counterpart, only deals with the stability (unstability) of the equilibria. Finally, some numerical simulations are performed by MATLAB, to support our analytic results.

کلمات کلیدی:

Ratio-dependent functional response model, Fractional derivative, Discretization, Bifurcation, chaos

لینک ثابت مقاله در پایگاه سیویلیکا: