Soluções de Ondas Viajantes em um Sistema Difusivo Predador-Presa Não Local

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The aim of this work is the study of the following diffusive predator-Prey system of equations, which is an extension of the one studied in previous works ([1], [2])

$$\begin{aligned} \frac{\partial U}{\partial T} &= AU[1 - \tfrac{1}{K}(g * U)] - BUV + D_1\nabla^2 U \\ \frac{\partial V}{\partial T} &= CUV - DV + D_2\nabla^2 V \end{aligned} \tag{1}$$

Where

$$g * U = \int_{-\infty}^{\infty} g(x-y)U(y,t)dy. \tag{2}$$

The constants $D1$, $D2$, A, K, B, C, and D, as well as the weight funtion g are all positive. This system models the dynamics of two interacting populations, where the first one , the prey, obeys a nonlocal logistic growth; and the second one, the predator, interacts with the prey, with exponencial decrease of its density in the absence of first species, which indicates that the predation of the second species is specific. We also assume that the predator diffuses more rapidly than the prey, a fact which simplifies the analysis. The key feature in these equations is the presence of the convolution term (1) which models a nonlocal intera-specific interaction among the prey individuals, just as it was indicated in [3]. After a suitable approximation of the first equation, we analyse the possibility of coexistence of these species, by investigationg the conditions under which a travelling wave solution, which connects trivial steady states and a nontrivial one, exists. we obtain the existence of this solution for any combination of the constants, a fact which is not verified in[1], [2], where a minimal wave speed exists. Besides, the stabilization towards the nontrivial equilibrium all ways occurs in a oscillationg pattern, which is in accordance with the results in [3], with the one-equation model, where a non-monotonic wave connectiong the steady states is obtained.

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Referências

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