

Colloquium

Traveling wave solutions for a continuous and discrete diffusive predator-prey model

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摘 要：

We study a diffusive predator-prey model of Lotka-Volterra type functional response in which both species obey the logistic growth such that the carrying capacity of the predator is proportional to the prey population and the one for prey is a constant. Both continuous and discrete diffusion are addressed. Our aim is to see whether both species can survive eventually, if an alien invading predator is introduced to the habitat of an existing prey. The answer to this question is positive under certain restriction on the parameter. Applying Schauder's fixed point theory with the help of suitable upper and lower solutions, the existence of traveling wave solutions for this model is proven. Furthermore, by deriving the non-existence of traveling wave solutions, we also determine the minimal speed of traveling waves for this model. This provides an estimation of the invading speed.