

# Optimization of species survival for logistic models with non-local dispersal<sup>☆</sup>

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## Abstract

To describe the effects of spatial dispersal strategies and heterogeneous environments on the dynamics of species, we study a logistic model with non-local dispersals for single species. The aim of this paper is to study the optimization of species survival and the investigations are carried out from two aspects: optimization of survival chances and maximization of total population of species. W.l.o.g., assume that the spatial distribution of resources  $m \in L^\infty(\Omega)$  satisfies

$$-1 \leq m(x) \leq 1 \text{ and } \frac{1}{|\Omega|} \int_{\Omega} m(x) dx \leq \alpha, \alpha \in (-1, 1).$$

Our main results indicate that  $m = \chi_E - \chi_{\Omega \setminus E}$ , where  $E \subset \Omega$  is measurable with  $|E|/|\Omega| = (1 + \alpha)/2$  and  $\chi_E$  is the characteristic function of  $E$ , is optimal for both the survival chances and total population of species respectively.

*Keywords:* non-local dispersal, optimization, survival chances, total population

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