

Propagation in a fractional reaction-diffusion equation in a periodic hostile environment

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The question studied here is the large time behavior of the solutions $n(t, x)$ of the non-local reaction-diffusion equation $\partial_t n + (-\Delta)^\alpha n = n - n^2$, posed in a periodic domain composed of disconnected intervals. Such equation models the growth and the invasion of a species subject to a non-local dispersion in an environment that has hostile patches. The function n stands for the density of the population. The fractional Laplacian describes the motions of individuals, it takes into account the possibility of "jump" (move rapidly) of individuals from one point to another. Contrary to what happens for standard diffusion $\alpha = 1$, there is here a unique bounded stationary state that invades the domain exponentially fast.

Références

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