Permanence in nonautonomous systems of parabolic reaction-diffusion equations of Kolmogorov type[*]

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Abstract

In a joint paper of the first-named author with Wenxian Shen and Xiao-Qiang Zhao sufficient conditions were given for permanence (uniform persistence) in a nonautonomous system of parabolic reaction–diffusion equations of Kolmogorov type

$$(u_i)_t = \Delta u_i + u_i f_i(t, x, u), \qquad t > 0, \ x \in \Omega,$$

with Dirichlet or Robin boundary conditions, where $\Omega \subset \mathbb{R}^N$ is a bounded domain with sufficiently smooth boundary and $f = (f_1, \ldots, f_N) \colon (-\infty, \infty) \times \bar{\Omega} \times \mathbb{R}_+^N \to \mathbb{R}^N$ is a sufficiently regular function.

In the present communication we consider the above problem under the assumption that the function f is defined only on $[0, \infty) \times \bar{\Omega} \times \mathbb{R}_+^N$. It will be done with the help of an extension (due to M. S. Wójcik) of the theory of permanence for processes initiated by X.-Q. Zhao.

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