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ON TIME-PERIODIC SOLUTIONS OF SOME NONLINEAR PARABOLIC EQUATIONS WITH NONMONOTONE MULTIVALUED TERMS

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Dedicated to the memory of Professor Ioan I. Vrabie

ABSTRACT. In this paper we study the existence of time periodic solutions to a class of nonlinear parabolic equations with multivalued nonlinear terms subject to the homogeneous Dirichlet boundary condition. We give two types of existence results: one for large periodic solutions with any large data, and the other for small periodic solutions with small data. Both concern the case where the nonlinear terms contain either a upper semicontinuous multivalued term or a lower semicontinuous multivalued term. Some applications of our results are also given.

1. Introduction

Let $\Omega \subset \mathbb{R}^N$ be a bounded open subset of \mathbb{R}^N with smooth boundary $\partial\Omega$, and let $Q_T := \Omega \times [0, T]$ and $\Gamma_T := \partial\Omega \times [0, T]$ with $T > 0$. Consider the following

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