PARABOLIC EQUATIONS
WITH LOCALIZED LARGE DIFFUSION:
RATE OF CONVERGENCE OF ATTRACTORS

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ABSTRACT. In this paper we study the asymptotic nonlinear dynamics of scalar semilinear parabolic problems of reaction-diffusion type when the diffusion coefficient becomes large in a subregion in the interior to the domain. We obtain, under suitable assumptions, that the family of attractors behaves continuously and we exhibit the rate of convergence. An accurate description of the localized large diffusion is necessary.

1. Introduction

Local spatial homogenization is a feature that appears in several physical phenomenona. It is often present in heat conduction in materials for which the heat may diffuse much more faster in some regions than in others (composite materials).

Reaction-diffusion models for which the diffusivity varies considerably from one region to another have solutions that tend to become spatially homogeneous in the regions where the diffusivity is large. There has been many studies of mathematical models for which this property was exploited (see, for example, [2], [7] and [16]).