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THE LONG-TIME BEHAVIOR OF WEIGHTED p-LAPLACIAN EQUATIONS

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Abstract. In this work we study weighted p-Laplacian equations in a bounded domain with a variable and generally non-smooth diffusion coefficient having at most a finite number of zeroes. The main attention is focused on the case that the diffusion coefficient $a(x)$ in such equations satisfies the inequality $\liminf_{x\to z}|x-z|^{-p}a(x)>0$ for every $z\in\overline{\Omega}$. We show the existence of weak solutions and global attractors in $L^2(\Omega)$, $L^q(\Omega)$ $(q\geq 2)$ and $D_0^{1,p}(\Omega)$, respectively.

1. Introduction

Let Ω be a bounded smooth domain in $\mathbb{R}^n$ $(n\geq 2)$. We consider weighted p-Laplacian equations

$$\begin{cases} \dfrac{\partial u}{\partial t}-\operatorname{div}(a(x)|\nabla u|^{p-2}\nabla u)+f(u)=g & \text{in } \Omega\times\mathbb{R}^+,\\ u=0 & \text{on } \partial\Omega\times\mathbb{R}^+,\\ u(x,0)=u_0 & \text{in } \Omega, \end{cases} \tag{1.1}$$

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