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THE EXISTENCE AND MULTIPLICITY OF NONTRIVIAL SOLUTIONS FOR A CLASS OF p-MONGE–AMPÈRE SYSTEM

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Abstract. In this paper, we deal with the following p-Monge–Ampère system:

$$\begin{cases} \det(D(|Du_1|^{p-2}Du_1)) = f_1(|x|, -u_2), & x \in B, \\ \det(D(|Du_2|^{p-2}Du_2)) = f_2(|x|, -u_1), & x \in B, \\ u_1 = u_2 = 0, & x \in \partial B, \end{cases}$$

where $B = \{x \in \mathbb{R}^n : |x| < 1\}$ and f_i $(i = 1, 2)$ are continuous and nonnegative functions. Based on the fixed-point theory, some results regarding existence of radial solutions are established when f_i $(i = 1, 2)$ satisfy some new growth conditions.

1. Introduction

The p-Monge–Ampère type equations with $p \geq 2$ are a class of important fully nonlinear partial differential equations, which play a significant role in the fields of differential geometry, fluid mechanics, optimization problems and other disciplines, see, for instance, [3], [11], [14].

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