

A THREE SOLUTIONS THEOREM FOR PUCCI'S EXTREMAL OPERATOR AND ITS APPLICATION

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ABSTRACT. In this article we prove a three solution type theorem for the following boundary value problem:

$$\begin{cases} -\mathcal{M}_{\lambda,\Lambda}^+(D^2u) = f(u) & \text{in } \Omega, \\ u = 0 & \text{on } \partial\Omega, \end{cases}$$

where Ω is a bounded smooth domain in $\mathbb{R}^N$ and $f: [0, \infty] \rightarrow [0, \infty]$ is a C^α function. This is motivated by the work of Amann [3] and Shivaji [27], where a three solutions theorem has been established for the Laplace operator. Furthermore, using this result we show the existence of three positive solutions to above boundary value by explicitly constructing two ordered pairs of sub and supersolutions when f has a sublinear growth and $f(0) = 0$.

1. Introduction

The purpose of this article is to establish a three solutions type theorem (see Theorem 3.7) to the following boundary value problem:

$$(1.1) \quad \begin{cases} -\mathcal{M}_{\lambda,\Lambda}^+(D^2u) = f(u) & \text{in } \Omega, \\ u = 0 & \text{on } \partial\Omega, \end{cases}$$

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