

Improved Kato's inequalities for the quasilinear elliptic operator and relating topics.

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Abstract

Let $1 < p < \infty$, $p^* = \max[1, p - 1]$ and let Ω be a bounded domain of $R^N (N \geq 2)$.

In this talk, we consider a class of second order quasilinear elliptic operators \mathcal{A} in Ω with a growth order of degree $p - 1$, which includes the p -Laplace operator Δ_p . We establish improved Kato's inequalities, the inverse maximum and the strong maximum principle under some assumption. To this end, we introduce a notion of admissible class of functions. We also construct a counter example to the admissible class, originally by J.Serrin to give a pathological solution to the Dirichlet boundary value problem.

We further prove the existence and partial uniqueness results of the admissible solution for the boundary value problem with a measure data.

$$\begin{cases} -\mathcal{A}u = \mu & \text{in } \Omega, \\ u = 0 & \text{on } \partial\Omega. \end{cases}$$