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A Generalization of the Stampacchia Lemma and Applications

We present a generalization of Stampacchia Lemma and give applications to regularity property of weak and entropy solutions of degenerate elliptic equations of the form

$$\begin{cases} -\operatorname{div}(a(x, u(x))Du(x)) = f(x), & \text{in } \Omega, \\ u(x) = 0, & \text{on } \partial\Omega, \end{cases}$$

where $\frac{\alpha}{(1+|u|)^\theta} \leq a(x, s) \leq \beta$ with $0 < \alpha \leq \beta < \infty$ and $0 \leq \theta < 1$. The

method to derive regularity seems to be simpler than the classical ones.

Keywords: Stampacchia Lemma, generalization, degenerate elliptic equation, regularity.

MSC: 35J70.