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Isolated Singularities of Nonlinear Polyharmonic Inequalities

Steven D. Taliaferro

(Submitted on 22 Jul 2011)

We obtain results for the following question where $m\ge 1$ and $n\ge 2$ are integers. {\bf Question.} For which continuous functions $f\colon [0,\infty)\to [0,\infty)$ does there exist a continuous function $\phi\colon (0,1) \to (0,\infty)$ such that every C^{2m} nonnegative solution $u(x)$ of
0 \le -\Delta^m u\le f(u)\quad \text{in}\quad B_2(0)\backslash\{0\}\subset {\bb R}^n
satisfies
u(x) = O(\phi(|x|))\quad \text{as}\quad x\to 0
and what is the optimal such ϕ when one exists?

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