On the Asymptotic and Qualitative Behavior of Solutions to Quasi-linear Differential Equations

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Consider the differential equation

$$y^{(n)} + \sum_{j=0}^{n-1} a_j(x)\, y^{(j)} + p(x)\, |y|^k \mathrm{sgn} y = 0 \tag{1}$$

with $n \geq 1$, $k > 1$, and continuous functions $p(x)$ and $a_j(x)$.

The results obtained concern qualitative properties of solutions to this equation, namely their uniform estimates, oscillatory criteria, sufficient conditions for existence of solutions with quasi-polynomial behavior at infinity.

In the case $a_j(x) \equiv 0$, the results obtained concern asymptotic behavior of the blow-up solutions. One of the questions to be discussed is relation between the "quantity" of such solutions having power asymptotic form and the spectrum of a differential operator related to equation (1).

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