Barbara Szomolay

Decay of solutions of some degenerate hyperbolic equations of Kirchhoff type

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Abstract: In this paper we study the asymptotic behavior of solutions to the damped, nonlinear vibration equation with self-interaction

$$\ddot{u} = -\gamma\dot{u} + m(\|\nabla u\|^2)\Delta u - \delta|u|^\alpha u + f,$$

which is known as degenerate if $m(\cdot) \geq 0$, and non-degenerate if $m(\cdot) \geq m_0 > 0$. We would like to point out that, to the author's knowledge, exponential decay for this type of equations has been studied just for the special cases of α. Our aim is to extend the validity of previous results in [5] to $\alpha \geq 0$ both to the degenerate and non-degenerate cases of m. We extend our results to equations with Δ^2.

Keywords: asymptotic behavior of solutions, hyperbolic PDE of degenerate type
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