

Weak Solutions and Blow-up for Wave Equations of p -Laplacian Type with Supercritical Sources

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Abstract: In this talk we present a study of a quasilinear wave equation

$$u_{tt} - \Delta_p u - \Delta u_t = f(u)$$

in a bounded domain $\Omega \subset \mathbb{R}^3$ with Dirichlet boundary conditions. The operator Δ_p denotes the p -Laplacian, $2 < p < 3$. The nonlinear feedback $f(u)$ is a source which is allowed to have a supercritical exponent, in the sense that the associated Nemytski operator is not locally Lipschitz from $W_0^{1,p}(\Omega)$ into $L^2(\Omega)$. The linear term Δu_t provides a damping effect. Under suitable assumptions on the parameters, we prove the existence of local weak solutions, which can be extended globally provided the damping term dominates the source in some sense. Moreover, a blow-up result is proved for solutions with negative initial total energy.