

ENERGY DECAY ESTIMATES FOR THE WAVE EQUATION WITH SUPERCRITICAL NONLINEAR DAMPING

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We consider a damped wave equation in a bounded domain. The damping is nonlinear and is homogeneous with degree $p - 1$ with $p > 2$. First, we show that the energy of the strong solution in the supercritical case decays as a negative power of the time variable t ; the rate of decay is the same as in the subcritical or critical cases, provided that the space dimension does not exceed ten. Next, relying on a new differential inequality, we show that if the initial displacement is further required to lie in L^p , then the energy of the corresponding weak solution decays logarithmically in the supercritical case. Those new results complement those in the literature and open an important breach in the unknown land of super-critical damping mechanisms. Several extensions are also discussed. This is a joint work with Alain Haraux.

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