Global existence for a class of semi-linear wave equations with variable coefficients

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Abstract

The main goal of this talk is to discuss about the existence and nonexistence of global small data solutions to the Cauchy problem for the semi-linear dissipative wave equations

$$u_{tt} - a(t)^2\Delta u + c(t)u_t = u_t^2 - a(t)^2|\nabla u|^2,\ (t,x) \in (0,\infty)\times\mathbb{R}^n,$$
$$u(0,x) = \phi(x), \quad u_t(0,x) = \psi(x).$$

For the coefficient function $a = a(t)$ we assume a representation on the form

$$a(t) = \lambda(t)b(t),$$

where $\lambda(t)$ describes the asymptotic behavior for large t, whereas $b(t)$ is bounded and allows us to include certain oscillations. We will explain how the interaction between the speed of propagation $\lambda(t)b(t)$ and the damping coefficient $c(t)$ will influence global existence of small data solutions.