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Asymptotic behavior of solutions to damped wave equation with derivative nonlinear term

Abstract

In this talk we study the Cauchy problem for damped wave equation with derivative nonlinear term:

$$u_{tt} - \Delta u + u_t = |\nabla_x u|^\sigma, \quad t > 0,\ x \in \mathbb{R}^n, \tag{1}$$

with initial data

$$u(0,x) = u_0(x), \quad u_t(0,x) = u_1(x), \quad x \in \mathbb{R}^n, \tag{2}$$

where $\sigma > 1 + 2/(n+1)$ is a constant. The Cauchy problem for the corresponding semilinear damprd wave equation

$$u_{tt} - \Delta u + u_t = |u|^\sigma, \quad t > 0,\ x \in \mathbb{R}^n \tag{3}$$

has been investigated by several authors. Moreover, it is known that equation (3) admits global solution in time, when $\sigma > 1 + 2/n$ and initial data are sufficiently small.

We will show the existence in global in time and asymptotic behavior of the solution to (1)–(2), provided that $n = 1, 2, 3$ and onitial data (u_0, u_1) are sufficiently small.

Bibliography

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