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Global existence of small data solutions for semi-linear damped wave equations

Abstract

The goal of our talk is to consider the global existence (in time) of small data solutions to the following semi-linear Cauchy problem

$$(1) \quad u_{tt} - a^2(t)\Delta u + b(t)u_t = f(u, a(t)\nabla u, u_t), \quad u(0, x) = u_1(x), \quad u_t(0, x) = u_2(x)$$

with an increasing time-dependent speed of propagation term $a^2(t)$ and a time-dependent positive coefficient $b(t)$ in the damping term $b(t)u_t$. We distinguish between two semi-linear models with respect to the following classification of $b(t)$: *non-effective dissipation* and *effective dissipation*. The first model we are interested in is the model with non-effective dissipation and on the right-hand side a source in the form $f(a(t)\nabla u, u_t) = u_t^2 - a^2(t)|\nabla_x u|^2$ (in the case $b(t) \equiv 0$ the results can be found in [2]), whereas in the other model with effective dissipation we consider the right-hand side source in the form $|f(u)| \approx |u|^p$. Here we follow the technique of [3]. The results presented are part of the thesis of Bui Tang Bao Ngoc[1].

BIBLIOGRAPHY

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