

1046-35-268

Maisa M Khader* (khader@math.utk.edu), 1160 Kenesaw Ave #A1, Knoxville, TN 37919.
Weighted L^2 Estimates for Dissipative Nonlinear Wave Equations with Space-Time Dependent Potential.

We studied the long time behavior of solutions of wave equations with absorption $|u(t, x)|^{p-1}u(t, x)$ and damping with space-time dependent potential $a(t, x)u_t(t, x)$, where $a(t, x) \sim a_0(1 + |x|)^{-\alpha}(1 + t)^{-\beta}$ for large $|x|$ and t ; $a_0 > 0$. For $\alpha \in (-\infty, 1)$, $\beta \in (-1, 1)$ and $1 < p < (n + 2)/(n - 2)$ we establish decay estimates for the energy, L^2 and L^{p+1} norms of solutions. We used the new technique developed by Todorova and Yordanov, which is able to capture the exact decay of the wave equations with space dependent coefficients. The presence of a space-time dependent potential, as in our case, requires modifications of this technique.

1. For exponents α, β such that $\alpha \in (0, 1)$ and $\beta \in (-1, 1)$ and $0 < \alpha + \beta < 1$ we found three different regimes for the decay of solutions dependent on the exponent of the absorption term.
2. In the case $\alpha \in (-\infty, 0]$ and $\beta \in (-1, 1)$ we found one threshold and correspondingly two different regimes for the decay of solutions.

(Received August 24, 2008)