

Nonexistence of global solutions to wave Equations with structural damping and nonlinear memory

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Abstract

For the following wave equations with structural damping and nonlinear memory source terms $[u_{tt} + (-\Delta)^{\frac{\alpha}{2}}u + (-\Delta)^{\frac{\beta}{2}}u_t = \int_0^t (t-s)^{\gamma-1} |u(s)|^p ds]$ and $[u_{tt} + (-\Delta)^{\frac{\alpha}{2}}u + (-\Delta)^{\frac{\beta}{2}}u_t = \int_0^t (t-s)^{\gamma-1} |u_s(s)|^p ds]$ posed in $(x,t) \in \mathbb{R}^N \times [0, \infty)$, where $u = u(x,t)$ is real-value unknown function, $p > 1$, $\alpha, \beta \in (0, 2]$, $\gamma \in (0, 1)$, we prove the nonexistence of global solutions. Moreover, we give an upper bound estimate of the life span of solutions.

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