NECESSARY AND SUFFICIENT CONDITION FOR INFINITE TIME BLOW UP OF GLOBAL SOLUTIONS TO WAVE EQUATION WITH LOGARITHMIC NONLINEARITY

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ABSTRACT

This work investigates global solutions to the initial boundary value problem for the wave equation with logarithmic nonlinearity in a bounded domain. A novel necessary and sufficient condition for infinite time blow up of global weak solutions is proved in the case of arbitrary positive initial energy. As a consequence, we derive a new sufficient condition on the initial data that ensures blow up at infinity of the corresponding global solutions. Moreover, we identify classes of initial data for which this sufficient condition is more general than those previously known (see [1, 2, 3, 4]).

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***K*eywords** Nonlinear wave equation · Logarithmic nonlinearities · Blow up at infinity

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