L^1 estimates for radial solutions to the free wave equation and semilinear problems

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Abstract

It is well known that, for space dimension $n > 3$, one cannot generally expect $L^1 - L^p$ estimates for the solution of the Cauchy problem for the wave equation. In this talk we discuss the benefits in the range of $p \geq 1$ such that $L^1 - L^p$ estimates hold under the assumption of radial initial data. In the particular case of odd space dimension, we prove $L^1 - L^p$ estimates for $1 \leq p < \frac{2n}{n-1}$ and apply these estimates to derive global existence of small data solutions to the semilinear wave equation with power nonlinearity $|u|^\sigma$, $\sigma > \sigma_c(n)$, where the critical exponent $\sigma_c(n)$ is the Strauss index.