ON BILINEAR LITTLEWOOD-PALEY SQUARE FUNCTIONS

M. T. LACEY

Abstract

On the real line, let the Fourier transform of $k_n$ be $\hat{k}_n(\xi) = \hat{k}(\xi - n)$ where $\hat{k}(\xi)$ is a smooth compactly supported function. Consider the bilinear operators $S_n(f, g)(x) = \int f(x + y)g(x - y)k_n(y)\,dy$. 

If $2 \leq p, q \leq \infty$, with $1/p + 1/q = 1/2$, I prove that

$$\sum_{n=-\infty}^{\infty} \|S_n(f, g)\|_2^2 \leq C^2\|f\|_p^2\|g\|_q^2.$$ 

The constant $C$ depends only upon $k$.

Research supported in part by an NSF grant.