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We prove a non-trivial lower bound for the L^∞ norm of hyperbolic sums of Haar functions in three dimensions. This inequality leads to a new discrepancy function estimate:

$$\|D_N\|_\infty \gtrsim (\log N)^{1+\eta},$$

which significantly improves the famous result of Jozsef Beck. We also discuss connections of this inequality to other areas, such as probability and approximation theory. (Received January 07, 2007)