1154-05-851 **Asaf Ferber**, **Vishesh Jain*** (`visheshj@mit.edu`) and **Yufei Zhao**. *Hadamard matrices are even harder to find.*

A square matrix H of order n whose entries are $\{\pm 1\}$-valued is called a Hadamard matrix of order n if its rows are pairwise orthogonal. The famous Hadamard conjecture asserts that there exists a Hadamard matrix for every n which is a multiple of 4. We consider the complimentary problem of bounding $H(n)$ – the number of Hadamard matrices of order n – from above.

It is easily established that $H(n)$ is at most $2^{\binom{n+1}{2}}$. Using a novel approach to the so-called Littlewood-Offord problem for vector sums, we show that there exists some absolute constant $c > 0$ such that for all sufficiently large n, $H(n)$ is at most $2^{(1-c)n^2/2}$, thereby providing the only known non-trivial upper bound on the number of Hadamard matrices of order n. (Received September 11, 2019)