

Conjecture 4.23 [*Matrix Six-Deviations Suffice*] *There exists a universal constant C such that, for any choice of n symmetric matrices $H_1, \dots, H_n \in \mathbb{R}^{n \times n}$ satisfying $\|H_k\| \leq 1$ (for all $k = 1, \dots, n$), there exists $\varepsilon_1, \dots, \varepsilon_n \in \{\pm 1\}$ such that*

$$\left\| \sum_{k=1}^n \varepsilon_k H_k \right\| \leq C\sqrt{n}.$$

Open Problem 4.3 *Prove or disprove Conjecture 4.23.*

Note that, when the matrices H_k are diagonal, this problem corresponds to Spencer's Six Standard Deviations Suffice Theorem [Spe85].

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[Spe85] J. Spencer. Six standard deviations suffice. *Trans. Amer. Math. Soc.*, (289), 1985.

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