

AN ANALOG OF HADAMARD'S DETERMINANT INEQUALITY FOR PERMANENTS

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Let F be an N by N matrix and denote by \vec{f}_j the j -th column of the matrix F and $|\vec{f}_j|$ its Euclidean length. Hadamard's inequality states that

$$|\det F| \leq \prod_{j=1}^N |\vec{f}_j|.$$

Here we shall prove that

$$|\text{perm}(F)| \leq \frac{N!}{N^{N/2}} \prod_{j=1}^N |\vec{f}_j|,$$

with equality when F is a constant matrix. This is joint work with Eric Carlen and Elliott Lieb.