

Abstract

On the Hadamard maximal determinant problem

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In a celebrated paper of 1893, Hadamard established the maximal determinant theorem, which establishes an upper bound on the determinant of a matrix with complex entries of norm at most 1. His paper concludes with the suggestion that mathematicians study the maximum value of the determinant of an $n \times n$ matrix with entries in $\{\pm 1\}$. This is the Hadamard maximal determinant problem.

It is known that an $n \times n$ matrix with entries in $\{\pm 1\}$ that attains Hadamard's upper bound exists only when n is equal to 1, 2, or a multiple of 4. Such a matrix is now commonly known as a Hadamard matrix, and these have been well studied. Less well known, is the state of play where $n > 4$ and $n \not\equiv 0 \pmod{4}$. In this talk I will survey the progress on the Hadamard maximal determinant problem for $n \not\equiv 0 \pmod{4}$.

This is joint work with Patrick Browne, Fintan Hegarty, and Pádraig Ó Catháin.