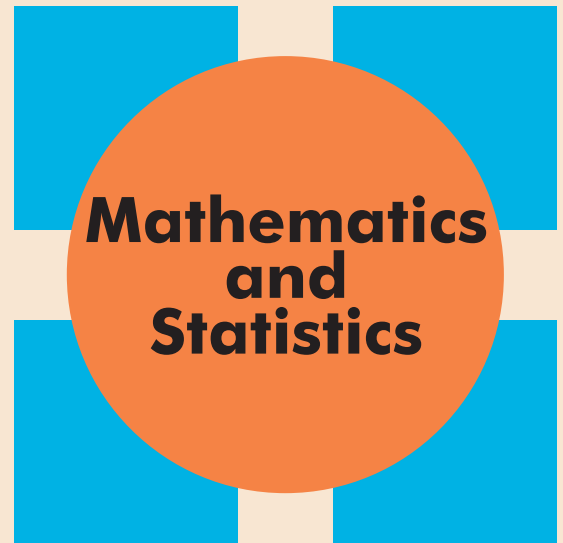


COLLOQUIUM

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The Operator Norm of a Matrix



Date: Friday February 15, 2019

Time: 3:30 - 4:30 PM

Room: CL 305

Abstract: It is standard to consider $m \times n$ complex matrices A as linear operators between the Hilbert spaces \mathbb{C}^n and \mathbb{C}^m . As such, it makes sense to consider the operator norm $\|A\|$ of our matrix A . The number $\|A\|$ depends of course on the entries of A , but the concrete dependence is far from obvious. In this talk we will show that, when A has integer entries and $\|A\|$ is small enough, it is possible to completely characterize the admissible values of $\|A\|$. For instance, after the talk it will be obvious that there is no matrix A with integer entries, of any size, such that $\|A\| = 1/2$; in fact, if $\|A\| < 2$, then $\|A\|$ can only be rational if $\|A\| = 1$. The number $\sqrt{2}/2$ cannot be the norm of a matrix with integer entries, but $\sqrt{2}$ and $\sqrt{3}$ can. All these facts are easy consequences of the result we will discuss.