COMBINATORICS SEMINAR
On The Number of Sums and Products

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Abstract:

Let A be a finite subset of complex numbers. The *sum-set* of A is $A+A=\{a+b : a,b\in A\}$, and the *product-set* is $A\cdot A=\{a\cdot b : a,b\in A\}$. Erdős and Szemerédi proved the inequality $\max(|A+A|,|A\cdot A|)\geq c|A|^{1+\varepsilon}$ for a small but positive ε, where A is a subset of integers. They conjectured that $\max(|A+A|,|A\cdot A|)\geq c|A|^{2-\delta}$ for any positive δ. In this talk we will review recent results on the sum-product problem and we will show that if $|A|=n$, then $cn^{14}/\log^3 n \leq |A+A|^8\cdot|A\cdot A|^3$, whence $cn^{\frac{14}{11}-\varepsilon}\leq \max\{|A+A|,|A\cdot A|\}$.