Old and new problems in extremal set theory

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Zoom meeting ID: 878 5224 5705   Password: 121323
Link: https://us02web.zoom.us/j/87852245705
Venue: Room 102, Shanghai Center for Mathematical Sciences

Abstract:

We consider families of finite sets, that is, subsets of the power set of the n-element finite set $[n] = \{1, 2, \ldots, n\}$. I have spent most of my mathematical life concerning easy-to-state (and often hard-to-solve) problems , trying to determine the MAXIMAL size of a family (i.e., a subset of $2^{[n]}$) satisfying certain conditions. Let me give just one example: suppose that $r \geq 2$, $t \geq 1$ are fixed and any r members of the family have at least t elements in common. I proved that for $n > t + 1$ the maximum is 2^{n-t} if and only if $t < 2^r - r$ but for $t > t(r)$ the problem is widely open. In preparation for the lecture try and prove the simple bound 2^{n-1} in the case $t = 1, r = 2$.