VCU Discrete Mathematics Seminar

Avoidance among Subspaces

Prof Shahriar Shahriari
(Pomona College)

Wednesday, Oct. 8
1:00-1:50 EDT

In person in 4145 Harris Hall. And a Zoom option:

`https://vcu.zoom.us/j/81475528886`
`password=graphs2357`

Let V be an n-dimensional vector space over a finite field of order q, and let $\mathcal{L}(V)$ be the partially ordered set (poset) of subspaces of V ordered by inclusion. The heuristic—going back to at least Gian-Carlo Rota—is that, as "$q \to 1$", the combinatorics of $\mathcal{L}(V)$ should be similar to that of $\mathbf{2}^{[n]}$, the poset of all subsets of a set with n elements—aka a Boolean lattice. In this talk, we will discuss two such instances, both regarding large families of subspaces that avoid certain configurations. What is the largest size of a family of k-dimensional subspaces of V, that does not include three subspaces A, B, and C with $A = (A \cap B) \oplus (A \cap C)$? What is the largest size of a family of subspaces (of any dimension) of V that does not include three subspaces A, B, and C with $A \subseteq B \cap C$ or $B + C \subseteq A$?

For the DM seminar schedule, see:

`https://go.vcu.edu/discrete`