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Algebraic Approaches to the Erdős-Ko-Rado Theorem

The Erdős-Ko-Rado (EKR) theorem is a famous result that is one of the cornerstones of extremal set theory. This theorem answers the question "What is the largest family of intersecting sets, of a fixed size, from a base set?" This question may be asked for any type of object for which there is some notion of intersection. For example, there have been recent results that prove that a natural version of the EKR theorem holds for permutations, vector spaces, integer sequences, domino tilings, partitions and matchings.

There are many vastly different proofs of these results, some are simply a straight-forward counting argument, others use graph theory and some require nuanced properties of related matrix algebra. In this talk I will show some of the difference proof methods for EKR theorems, with a focus on the more algebraic methods.