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*Using algebraic graph theory to solve problems in design theory*

In this talk I will give a number of examples of a problem in design theory that can be rephrased as a question about a graph. For all of these examples, bounds on the size of a design can be found from an eigenvalue bound from the appropriate graph. The problems I am particularly interested in are related to the Erdős–Ko–Rado theorem. This theorem gives an upper bound on the size of an intersecting set system and describes exactly which systems meet this bound. There are a surprising number of extensions of this famous theorem where the bound can be found using eigenvalue bounds on an appropriate graph.