ALYSSA SANKEY, University of New Brunswick

On strongly regular decompositions of block graphs of S($2, k, 2k^2 - k$)

A strongly regular design is a point-block incidence structure in which strongly regular graphs are defined on both the point set P and the block set B, and incidence satisfies certain regularity conditions. We investigate a sub-class of these with the property that a strongly regular graph Γ with vertex set $P \cup B$ is obtained by taking adjacency to be the union of adjacency on points, adjacency on blocks, and both point-block and block-point incidence. A strongly regular decomposition is a strongly regular graph whose vertex set may be partitioned in this way, such that the induced subgraphs are strongly regular. This talk will focus on a particular infinite family of parameters for strongly regular designs, and show that if Γ is the block graph of the Steiner system $S(2, k, 2k^2 - k)$, with k congruent to ± 2 mod 6, these parameters are realized. When k is a power of 2, the parameters of the block graphs coincide with those of the symplectic graphs. Examples are known for $k = 4, 8, 16$; existence is unknown in general with the smallest unresolved cases $k = 10$ and $k = 14$.