## Coherent configurations with few fibers - Part II

(Org: **Alyssa Sankey** (University of New Brunswick))

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**DENNIS EPPLE**, University of Toronto

*The Shrikhande Graph on the Crossroads of Algebraic and Topological Graph Theory*

The Shrikhande graph $Sh$ is the smallest strongly regular graph which is not a rank 3 graph. Its automorphism group $G$ has order 192. We consider $Sh$, its toroidal dual (the Dyck graph), and the dual of its Petrie dual. The action of $G$ (or of a subgroup) on the vertex sets of these graphs defines a coherent configuration of order 60 with three fibres of size 16, 32, and 12. Using computer algebra packages we investigate some non-Schurian association schemes that appear as mergings of these coherent configurations and give combinatorial descriptions. (Joint work with Mikhail Klin, Be'er Sheva).

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**SVEN REICHARD**, Dresden International University

*On Jordan Schemes II*

Jordan schemes as introduced by Cameron are non-associative generalizations of commutative association schemes. Such a scheme is proper if it is not the symmetrization of an association scheme.

Inspired by the discovery of the first proper Jordan schemes, and based on work by Hanaki and Miyamoto, an algorithmic search for small proper Jordan schemes was initiated. It relies on orderly generation and dynamic bounds on structure constants. Work is in progress.

It was confirmed that the smallest such scheme has 15 points. Further new objects on 16 and 18 points were found. Computer-free descriptions of these objects are being elaborated.

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**ALYSSA SANKEY**, University of New Brunswick

*Strongly regular designs admitting fusion to strongly regular decomposition*

A strongly regular decomposition of a strongly regular graph is a partition of the vertex set into two parts on which the induced subgraphs are strongly regular. Strongly regular designs are coherent configurations of rank 10 with two fibers in which the configuration on each fiber is a strongly regular graph. Haemers and Higman proved the equivalence between strongly regular decompositions, excluding special cases, and strongly regular designs with certain parameter conditions. In this talk we examine the SRDs that admit a fusion to SRG, and discuss parameter conditions, known families and (non)existence results.

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**JASON WILLIFORD**, University of Wyoming

*Coherent Configurations and Extremal Graph Theory*

In this talk, we will discuss some of the ways that the theory of coherent configurations can contribute to extremal graph theory, specifically to so-called degenerate Turàn-type problems on graphs. These are problems where, given a number of vertices $n$ and a bipartite graph $B$, one tries to maximize the number of edges of a graph with $n$ vertices with no copy of $B$ as a subgraph. Constructing such graphs is very difficult, we will discuss how coherent configurations are a natural tool to use in this search.