SHONDA DUECK, University of Winnipeg
Cyclic partitions of complete hypergraphs and large sets of combinatorial designs

We consider cyclic partitions of the complete k-uniform hypergraph on a finite set V, and their relationship to combinatorial designs. A *t-complementary k-hypergraph* is a k-uniform hypergraph with vertex set V and edge set E for which there exists a permutation $\theta \in Sym(V)$ such that the sets $E, E^\theta, E^{\theta^2}, \ldots, E^{\theta^{t-1}}$ partition the set of all k-element subsets of V. Such a permutation θ is called a (t,k)-*complementing permutation*. The t-complementary k-hypergraphs are a natural generalization of the almost self-complementary graphs, since the associated (t,k)-complementing permutation θ decomposes the complete k-uniform hypergraph into t isomorphic k-hypergraphs, which are permuted cyclically by θ. When these t-complementary k-hypergraphs in the decomposition are also *regular*, then they form a large set of t isomorphic combinatorial designs. We will look at some algebraic constructions for large sets of combinatorial designs that arise from these cyclic decompositions, including one which generalizes the well know Paley graph construction.