GRADUATE SEMINAR

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A review on the character table of the perfect matching association scheme

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Abstract: *A Perfect matching in a graph on $2k$ vertices is a set of edges that covers each vertex exactly once. Union of two perfect matchings gives us a set of even cycles. The shape of this set is an integer partition of $2k$; say λ. For any such λ, define matrix A_λ in which rows and columns are indexed by the perfect matchings of the complete graph K_{2k}, and the entry (m, n) is 1 if the union of the perfect matchings m and n gives us the even partition λ, and 0 otherwise. The set $\mathcal{A} = \{A_\lambda | \lambda \vdash 2k\}$ forms a symmetric association scheme which is known as perfect matching association scheme.*

Finding the complete character table of this scheme for $2k \geq 40$ is still an unsolved problem. In his 1994 paper, Muzychuk studied the eigenvalues of this association scheme and he only found the eigenvalues up to $2k = 10$. More recently in 2018, Srinivasan presented a recursive algorithm to find the character tables up to $2k = 40$. In this talk I will review Srinivasan's work, also I will present the progress I have made in determining a portion of the character table for all values $k \geq 6$. Such a result would give the size and structure of the largest set of 2-intersecting perfect matchings.

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