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On association schemes constructed from t-fold covers of schemes

Let $\mathcal{A}$ be an association scheme with vertex set X and relations $\{R_i\}$, and ω a weight function on the edges of the complete graph on X. If ω takes values in the group of tth roots of unity, we may view the weight as a t-fold cover of K_n. We assume that ω has certain regularity properties depending on $\mathcal{A}$. In this talk, we describe the construction of an association scheme on tn vertices, whose structure constants are analogous to those of $\mathcal{A}$ in that they count a subset of the triples (x, y, z) of vertices of fixed adjacency type – that is, $(x, y) \in R_i$, $(y, z) \in R_j$ and $(x, z) \in R_k$ – the subset consisting of those with a fixed weight $\alpha = \omega(x, y)\overline{\omega(x, z)}\omega(y, z)$. We conclude with explicit examples, noting in particular some non-symmetric schemes that arise from 4-fold covers of strongly regular graphs.