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Metathin association schemes and hypergroups

When one forgets the points of a thin association scheme, one obtains a group. For an arbitrary association scheme, forgetting the points leads to a $hypergroup$, an algebraic structure analogous to a group, but where the product of two elements (relations) is a set of elements, rather than a single element. One interesting class of association schemes is the $metathin$ association schemes – these are those which have a thin residue which is itself thin, and are therefore in a sense built up from a pair of groups. Metathin hypergroups are defined in an analogous way. Then, the underlying hypergroup of a metathin association scheme is a metathin hypergroup, and in fact, one can recover the structure constants of the association scheme from which the hypergroup arose. It is then natural to wonder if every metathin hypergroup can be obtained from an association scheme. In this talk, we present examples of metathin hypergroups which $cannot$ be obtained as the underlying hypergroup of an association scheme.