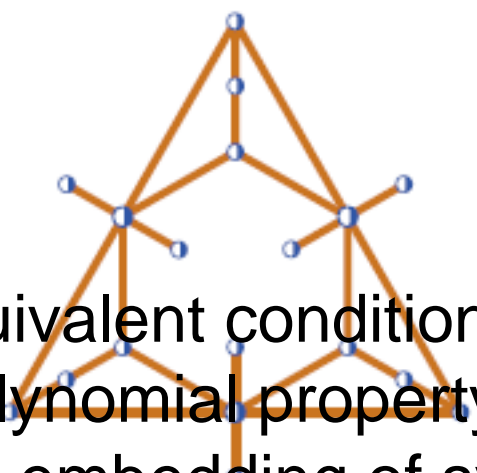


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An equivalent condition of the Q -polynomial property on the spherical embedding of symmetric association schemes

Content :

A finite set in a Euclidean space is called an s -distance set if there are s distances of two distinct elements in the set.

In 1977, Larman--Rogers--Seidel proved that a certain ratio related to distances of a 2 -distance set (Larman--Rogers--Seidel's ratio) must be an integer if the cardinality of the 2 -distance set is greater enough.

A symmetric association scheme of class d is naturally embedded as a spherical s -distance set with $s \leq d$ in a sphere.

In 2005, Bannai--Bannai proved that when a strongly regular graph is embedded as a 2 -distance set, Larman--Rogers--Seidel's ratio of this 2 -distance set appears in the character table of the strongly regular graph.

In 2009, Nozaki extended Larman--Rogers--Seidel's theorem to the case of any s -distance set and gave the ratios corresponding to the case of 2 -distance sets.

In this talk, first we give an extension of Bannai--Bannai's theorem with the generalized ratios of an s -distance set.

Namely, if an association scheme is Q -polynomial, then the ratios appear as some row in the character table of the association scheme.

Conversely, we will show that if the ratios appear as some row in the character table, then the association scheme is Q -polynomial.

This is joint work with Hiroshi Nozaki.

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