

# Schönberg's Theorem and the positive semidefinite cone of a Bose-Mesner algebra

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Customizing semidefinite programming bounds to the case of spherical codes arising from association schemes, we study Schönberg's Theorem in the context of the positive semidefinite cone of a Bose-Mesner algebra. This results in a number of lemmas that give new inequalities on the parameters of association schemes. We focus on the cometric ( $Q$ -polynomial) case and examine more closely, in this case, which Gegenbauer polynomials apply. These new inequalities rule out a number of feasible parameter sets in the Williford tables for 3-class primitive and 4-class  $Q$ -bipartite cometric schemes.

Joint work with Brian Kodalen.