

1116-14-1019

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Spectrahedral Cones with rank 1 extreme rays. Preliminary report.

A spectrahedral cone C is a slice of the cone of positive semidefinite matrices with a linear subspace L . The ranks of extreme rays of spectrahedral cones have been a subject of extensive study. It is natural to ask for what subspaces L do all of the extreme rays of C have rank 1? When L is a union of coordinate subspaces the answer was given by Agler-Helton-McCullough-Rodman. It turns out that this question has an unexpected connection to algebraic geometry and we will present some steps toward a full classification of such spectrahedral cones based on the classification of small reduced schemes by Eisenbud-Green-Hulek-Popescu. This is joint work with Rainer Sinn and Mauricio Velasco. (Received September 16, 2015)