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On a Combinatorial Theorem of Curtis Greene

Given n subsets A_1, A_2, \dots, A_n of a set X , suppose for simplicity (and without loss of generality) that they separate the points of X . Let C be the $n \times n$ matrix defined by $c_{ij} = |A_i \cap A_j|$ ($i, j = 1, 2, \dots, n$).

Theorem 1 *The characteristic functions of A_1, A_2, \dots, A_n are linearly independent if, and only if, $\det C \neq 0$.*

Some further results and related questions are also considered.