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## **Gerard Cornuejols**

## **Lehman Matrices**

## Abstract for the Colloquium and Combinatorics Seminar 2009 July 27

Two square 0,1-matrices, A and B, such that AB = E + kI (where E is the n×n matrix of all 1's and k is a positive integer) are called "Lehman matrices". These matrices figure prominently in Lehman's seminal theorem on minimally nonideal matrices.

There are two choices of k for which this matrix equation is known to have infinite families of solutions. When  $n = k^2 + k + 1$  and  $A = B^T$ , we get the point-line incidence matrices of finite projective planes, which have been widely studied in the literature. The other case occurs when k = 1 and n is arbitrary, but very little is known in this case. I will discuss this class of Lehman matrices.

The work is joint with Bertrand Guenin and Levent Tuncel.

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Last update: 2020/01/29 19:03