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Lehman Matrices

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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.
