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Rank Deficiency and Shadows in Totally Nonnegative Matrices

An $m \times n$ matrix is called totally nonnegative (TN) if all of its minors are nonnegative. It is a simple consequence of this definition to deduce that if $A = [a_{ij}]$ is TN with no zero rows or columns, and if $a_{kl} = 0$, then A will contain a block of zeros determined by the (k, l) position. In this talk, I will present a generalization of this phenomenon to larger sized rank deficient blocks, discuss some related results on row and column inclusion for TN matrices, and connections to the distribution of zero minors in a TN matrix.