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Compressions of totally positive matrices

A matrix is called totally positive if all of its minors are positive. If a matrix A is partitioned as $A = (A_{ij})$, $i, j = 1, 2, \dots, k$, in which each block A_{ij} is $n \times n$, then the $k \times k$ compressed matrix is given by $(\det A_{ij})$. It is well-known that if A is positive semidefinite, then the compressed matrix is also positive semidefinite and that the determinant of the compressed matrix is larger than $\det A$. For a totally positive matrix A, we show that the compressed matrix is also totally positive and we verify that the determinant of the compressed matrix exceeds $\det A$ when $k = 2, 3$. An extension that allows for overlapping blocks is also presented when $k = 2, 3$. For $k \geq 4$ we verify, by example, that the $k \times k$ compressed matrix of a totally positive matrix need not be totally positive.