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THE GENERAL TOTALLY POSITIVE MATRIX COMPLETION PROBLEM WITH FEW UNSPECIFIED ENTRIES*

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Abstract. For m-by-n partial totally positive matrices with exactly one unspecified entry, the set of positions for that entry that guarantee completability to a totally positive matrix are characterized. They are the positions (i,j), $i+j \leq 4$ and the positions (i,j), $i+j \geq m+n-2$. In each case, the set of completing entries is an open (and infinite in case $i=j=1$ or $i=m$, $j=n$) interval. In the process some new structural results about totally positive matrices are developed. In addition, the pairs of positions that guarantee completability in partial totally positive matrices with two unspecified entries are characterized in low dimensions.

Key words. totally positive matrices, matrix completion problems, partial matrix.

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