Summary: We show that the maximal number of equal entries in a totally positive (TP) (resp. totally nonsingular) \( n \times n \) matrix is \( \Theta(n^{4/3}) \) (resp. \( \Theta(n^{3/2}) \)). Relationships with point-line incidences in the plane, Bruhat order of permutations, and TP completability are also presented. We also examine the number and positionings of equal 2-by-2 minors in a 2-by-\( n \) TP matrix, and give a relationship between the location of equal 2-by-2 minors and outerplanar graphs.

MSC:

- 15B48 Positive matrices and their generalizations; cones of matrices
- 15A83 Matrix completion problems
- 05C50 Graphs and linear algebra (matrices, eigenvalues, etc.)
- 05A05 Permutations, words, matrices

Keywords:
totally positive matrices; point-line incidences; Bruhat order of permutations; outerplanar graphs; matrix completion

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References:
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