The almost-principal minors and ap-rank of symmetric matrices

An *almost-principal* minor of a given matrix is the determinant of a (square) submatrix whose row and column indices differ in exactly one index.

The *almost-principal rank characteristic sequence* (*apr-sequence*) of a symmetric matrix $B \in F^{n\times n}$ is $a_1a_2\cdots a_{n-1}$, where a_k is $\mathtt{A}$ (respectively, $\mathtt{N}$) if all of (respectively, none of) the almost-principal minors of order k are nonzero; if some but not all are nonzero, then $a_k = \mathtt{S}$.

The *almost-principal rank* of a symmetric matrix B, denoted by ap-rank(B), is the size of a largest nonsingular almost-principal submatrix of B.

Results regarding apr-sequences will be presented, and particular attention will be given to the relationship between the rank and ap-rank of a symmetric matrix.