THE SIMPLICIAL COMPLEX FOR THE IDEAL OF t-MINORS OF GENERIC PLURICIRCULANT MATRIX

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Let k be a field containing the n-th roots of unity where $\mathrm{char}(k) \not| n$. Let $\mathbf{P}$ be a pluricirculant matrix with b blocks, generic over k, i.e., a concatenation of b generic $n \times n$ circulant matrices. Then, $\mathbf{P}$ is equivalent to a matrix $\mathbf{D}$ which is a concatenation of generic diagonal matrices. The ideal of t-minors of $\mathbf{D}$ is generated by square-free monomials to which a simplicial complex is associated and the quotient ring is Stanley-Reisner. The complex is always pure and is shellable if $b = 1$. For $b > 1$ the complex is never Cohen-Macaulay. Let $\mathbf{P}_t$ be the submatrix of the first t rows of $\mathbf{P}$. By obtaining relevant Hilbert series formulae, it is shown that the set of "weakly ordered" maximal minors of $\mathbf{P}_t$ forms a minimal Gröbner basis for the ideal of t-minors of $\mathbf{P}$, providing an affirmative answer to a conjecture, for such a ground field k.