Anđelić, Milica; da Fonseca, Carlos M.
Some determinantal considerations for pentadiagonal matrices. (English) Zbl 07433005
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Let \( P = P_n(e, d, a, b, c) \) be an \( n \times n \) matrix with main diagonal \((a, \ldots, a)\), first upper subdiagonal \((b, \ldots, b)\), second upper subdiagonal \((c, \ldots, c)\), first lower subdiagonal \((d, \ldots, d)\), second lower subdiagonal \((e, \ldots, e)\), and the remaining entries are zero. R. B. Marr and G. H. Vineyard [SIAM J. Matrix Anal. Appl. 9, 579–586 (1988; Zbl 0661.15006)] gave a formula for \( \det P \) in terms of Chebyshev polynomials of second kind. This paper is often ignored in the literature but the present authors cite it, thus providing a complete reference to this area of research.

The following research problem is here considered. Assume that the subdiagonals of \( P \) are as above but arbitrarily located (e.g., not necessarily consecutive). Find \( \det P \). In two special cases the answer is given.

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MSC:
15A15 Determinants, permanents, traces, other special matrix functions
15B05 Toeplitz, Cauchy, and related matrices
33C45 Orthogonal polynomials and functions of hypergeometric type (Jacobi, Laguerre, Hermite, Askey scheme, etc.)

Keywords:
determinant; pentadiagonal matrices; Chebyshev polynomials

Full Text: DOI

References:

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