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Exact and asymptotic inverse of the Toeplitz matrix with polynomial singular symbol.
(English. Abridged French version) [Zbl 1012.65025](#)

C. R., Math., Acad. Sci. Paris 335, No. 8, 705-710 (2002), erratum 336, No. 5, 399-400 (2003).

Summary: From a previous work and an application of predictive polynomials we obtain two types of results. In a first part exact entries of the Toeplitz matrix are computed in the case where the symbol is $|P|^2 f$ and where f is a nonnegative regular function and P a polynomial with all its zeros on \mathbb{T} . In a second part we give an asymptotic expansion for symbols $(1 - \cos \theta)^p f$ when f is always a nonnegative regular function. These formulas use Green kernels associated to differential operators of order $2p$. Finally, we propose some applications to the computation of traces and determinants.

MSC:

- [65F05](#) Direct numerical methods for linear systems and matrix inversion
- [65F40](#) Numerical computation of determinants
- [15A15](#) Determinants, permanents, traces, other special matrix functions
- [15B57](#) Hermitian, skew-Hermitian, and related matrices
- [47B35](#) Toeplitz operators, Hankel operators, Wiener-Hopf operators
- [15A09](#) Theory of matrix inversion and generalized inverses
- [60G25](#) Prediction theory (aspects of stochastic processes)

Cited in **2** Reviews
Cited in **4** Documents

Keywords:

exact inverse matrix; asymptotic inverse matrix; polynomial singular symbol; Toeplitz matrix; Green kernels; differential operators; traces; determinants

Full Text: [DOI](#)

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