



On the asymptotics of a Toeplitz determinant with singularities

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We provide an alternative proof of the classical single-term asymptotics for Toeplitz determinants whose symbols possess Fisher-Hartwig singularities. We also relax the smoothness conditions on the regular part of the symbols and obtain an estimate for the error term in the asymptotics. Our proof is based on the Riemann-Hilbert analysis of the related systems of orthogonal polynomials and on differential identities for Toeplitz determinants. The result discussed in this paper is crucial for the proof of the asymptotics in the general case of Fisher-Hartwig singularities and extensions to Hankel and Toeplitz+Hankel determinants in [15].

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