APPROXIMATION OF CHARACTERISTIC POLYNOMIAL OF SPDTM

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Abstract: *In this note we present a modified Newton's method for computing the smallest eigenvalue λ_1 of a symmetric positive definite Toeplitz matrix (SPDTM) . This method based of the Taylor series characteristic polynomial of a SPDTM and respectively the even and odd characteristic polynomials of a SPDTM. The characteristic polynomial (and respectively the even and odd characteristic polynomials) has been approximated with the polynomial of the second order from the Taylor series because it is easy to develop $p_n(\lambda)''$ $\left(p_n^e(\lambda)'' \ \& \ p_n^o(\lambda)'' \right)$ from specific structure Toeplitz matrix from Gohberg-Simencul formulae.*

Key words: *eigenvalue problem, Toeplitz matrix, modified Newton's method, even and odd characteristic polynomials*

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