# STABILITY ANALYSIS OF A GENERAL TOEPLITZ SYSTEM SOLVER

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## Abstract

We show that a fast algorithm for the $QR$ factorization of a Toeplitz or Hankel matrix $A$ is weakly stable in the sense that $R^T R$ is close to $A^T A$. Thus, when the algorithm is used to solve the semi-normal equations $R^T Rx = A^T b$, we obtain a weakly stable method for the solution of a nonsingular Toeplitz or Hankel linear system $Ax = b$. The algorithm also applies to the solution of the full-rank Toeplitz or Hankel least squares problem $\min \|Ax - b\|_2$.

## Comments

Only the Abstract is given here. The full paper appeared as [1], based in part on [3] and the preliminary report [2].

## References

[1] A. W. Bojanczyk, R. P. Brent and F. R. de Hoog, Stability analysis of a general Toeplitz system solver, *Numerical Algorithms* 10 (1995), 225-244.

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[3] R. P. Brent, *Parallel algorithms and numerical stability for Toeplitz systems*, invited paper presented at SIAM Conference on Linear Algebra in Signals, Systems and Control, Seattle, August 16-19, 1993. `ftp://nimbus.anu.edu.au/pub/Brent/rpb143t.dvi.Z`

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