THE COMPUTATION OF THE JORDAN STRUCTURE OF TOTALLY NONNEGATIVE MATRICES TO HIGH RELATIVE ACCURACY

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Given the the factorization of a singular totally nonnegative matrix [2, 3, 1] A of order n into the product

$$A = B_1 B_2 \cdots B_{n-2} B_{n-1} D C_{n-1} C_{n-2} \cdots C_2 C_1,$$

with B_i, C_i^T lower bidiagonal totally nonnegative matrices and D diagonal one, an algorithm for computing the size of the Jordan block associated to the zero eigenvalue was proposed in [3] with high relative accuracy in floating point arithmetic and $O(n^4)$ computational complexity.

In this talk we propose a modification of the latter algorithm that computes the Jordan structure [4] of A with high relative accuracy in $O(n^3)$ computational complexity.

References

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[3] P. Koev, *Accurate Eigenvalues and Exact Zero Jordan Blocks of Totally Nonnegative Matrices*, submitted for publication, (2018).

[4] N. Mastronardi, P. Van Dooren, *Computing the Jordan Structure of an Eigenvalue*, SIAM J. Matrix Anal. Appl., 38 (2017), pp. 949–966.