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2025 SERIES

The First Algorithms to Compute the SVD

DATE & TIME

2 MAY 2025 (FRI) 4:00 - 5:00 PM

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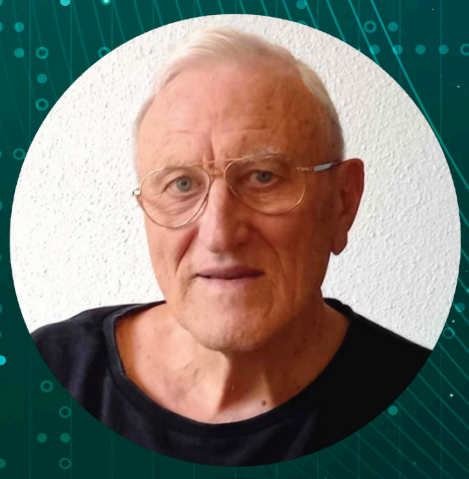

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ABSTRACT

The singular values of a matrix A can be computed as the square roots of the eigenvalues of the matrix A^T A. However, the calculation of A^T A in finite arithmetic seriously violates the smaller singular values. Therefore the pioneers Gene Golub, William Kahan and Christian Reinsch constructed new algorithms which compute the singular values directly from A without forming A^T A. We describe the first algorithm proposed by Golub/Kahan 1965. Then we discuss the two algorithms by Golub-Businger and by Reinsch which were developed independently at the same time in 1967. The current algorithm used in all software packages is the one of Reinsch. We explain why the algorithm of Reinsch appeared in “Handbook of Automatic Computation” under joint authorship with G.H. Golub.

SPEAKER’S BIOGRAPHY

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