

MATRIX DECOMPOSITIONS WITH NEWTON'S METHOD

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We present a general group-theoretic framework to derive efficient Newton-like iterations for the computation and certificate of various matrix decompositions, assuming that a suitable condition is known. We illustrate the approach on a list of applications, such as LU-decomposition, QR-decomposition, eigen-decomposition, singular value decomposition. This framework generalizes the contents of the paper "Newton-type methods for simultaneous matrix diagonalization" by Rima Khouja, Bernard Mourrain and Jean-Claude Yakoubsohn published in *Calcolo*(2022) 59:38.

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