On Deflations in Extended QR Algorithms

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Abstract

Deflation procedures are one of the core parts of every iterative eigenvalue algorithm. In this lecture we discuss the deflation criterion used in the extended QR algorithm based on the chasing of rotations. We show that this deflation criterion can be considered to be optimal with respect to absolute and relative perturbation of the eigenvalues.

Further, we present a generalization of aggressive early deflation to the new extended QR algorithms. Aggressive early deflation is the key technique for the identification and deflation of already converged eigenvalues. Often these possibilities for deflation are not detected by the standard technique. We present numerical results underpinning the power of aggressive early deflation in the context of extended QR algorithms. These ideas can be further generalized to middle deflations in the setting of extended QR algorithms.