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# IMPROVED INITIALIZATION OF THE ACCELERATED AND ROBUST QR-LIKE POLYNOMIAL ROOT-FINDING*

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**Abstract.** We approximate polynomial roots numerically as the eigenvalues of a unitary diagonal plus rank-one matrix. We rely on our earlier adaptation of the $QR$ algorithm, which exploits the semiseparable matrix structure to approximate the eigenvalues in a fast and robust way, but we substantially improve the performance of the resulting algorithm at the initial stage, as confirmed by our numerical tests.

**Key words.** $QR$ iteration, eigenvalue computation, polynomial roots, semiseparable matrices, DFT, FFT, Moebius transformation.

**AMS subject classifications.** 65H17, 65F15.

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