

1040-65-223

Ricardo S. Leite, Nicolau C. Saldanha and Carlos Tomei* (tomei@mat.puc-rio.br),
PUC-rio, R. Mq. S. Vicente 225, Rio de Janeiro, 22453-900, Brazil. *The subtle convergence of
Wilkinson's iteration. I. Cubic convergence for generic spectra.*

The Wilkinson shift is frequently used in the computation of eigenvalues of Jacobi matrices. Decades of use suggest that matrix deflation occurs rather fast, due to the cubic convergence to zero of the bottom off-diagonal entry. We show that this is indeed true for matrices which do not have three eigenvalues in arithmetic progression. The argument requires a new atlas on the manifold of real, symmetric, tridiagonal matrices with fixed spectrum. Each reduced matrix belongs to the interior of some chart, allowing convergence issues to be treated by local theory. Cubic convergence is proved using Lyapunov functions derived from the integrability properties of a continuous interpolation of the iteration. (Received February 22, 2008)