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Department of Mathematical
Sciences

TMA4205 Numerical
Linear Algebra
Fall 2017

Exercise set 6

- 1 Perform two steps of the the Rayleigh quotient iteration with starting vector $v^{(0)} = (1, 0, 0)^T$ for approximating an eigenvalue and eigenvector of the matrix

$$A = \begin{pmatrix} 2 & 1 & 1 \\ 1 & 1 & -2 \\ 0 & 0 & 1 \end{pmatrix}.$$

- 2 Perform one step of the QR-iteration with shift $\mu = 2$ in order to find the eigenvalues of the matrix

$$A = \begin{pmatrix} 6 & 3 \\ 3 & 2 \end{pmatrix}.$$

- 3 Assume that you apply one step of the QR-iteration with shift μ in order to find the eigenvalues of a matrix A , and that this shift is actually equal to one of the eigenvalues of A . How can you easily detect this situation based on the QR-decomposition of the shifted matrix?