Numerical Linear Algebra - Sheet 2

to be handed in until November 01, 2022, 11am.

To hand in your code for Problem 1.2.5, please form a group on Moodle and then hand in your code as a group.

Problem 1. Problem 1.2.5 in the Lecture Notes.

Problem 2. Problem 1.2.7 in the Lecture Notes.

Problem 3. Compute the eigenvalues and eigenvectors of the matrix

$$\begin{bmatrix} \cos(\alpha) & \sin(\alpha) \\ -\sin(\alpha) & \cos(\alpha) \end{bmatrix},$$

for $\alpha \in \mathbb{R}$.

Problem 4. Given a normal matrix A and a right eigenvector v of A with eigenvalue λ. Show that then the complex conjugate of v, $\bar{v}$, is a left eigenvector of A with the same eigenvalue λ, i.e.

$$v^* A = \lambda v^*.$$