Numerical Linear Algebra - Sheet 2

to be handed in until October 30, 2024, 11am.

Problem 1. Problem 1.2.7 in the Lecture Notes.

Problem 2. Problem 1.2.9 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.

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