

DiagonalisationProblem Sheet, Monday 21.08.2023 (Room U119)

Question 1: Given the symmetric matrix:

$$C = \begin{bmatrix} 1 & -1 & 0 \\ -1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix},$$

we are tasked to:

1. Find the eigenvalues and eigenvectors of C .
2. Determine if C is diagonalizable.
3. Find an orthonormal matrix P such that $C = PDP^T$, where D is a diagonal matrix.
4. Determine the determinant of C .
5. Compute C^{1000} .

Question 2: Given the symmetric matrix:

$$A = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{bmatrix},$$

Find an orthonormal matrix P such that $A = PDP^T$, where D is a diagonal matrix.