

M'sila University
Faculty of Mathematics and Computer
Department of Mathematics
Year 2023/2024
Algebra 4 course

TD Number 4

Exercise 1.

We consider the hermitian form φ over \mathbb{C}^2 defined by the matrix

$$A = \begin{bmatrix} 1 & i \\ -i & 0 \end{bmatrix}$$

1. Find the hermitian form φ .
2. Find the hermitian quadratic form q associated with φ .
3. Using Gauss method, find the sum of squares of q .
4. Find the rank and signature of q .
5. Find the orthonormal basis B' for q and the formula $D = \bar{P}^t A P$.

Exercise 2.

We consider the hermitian form φ over \mathbb{C}^3 defined by the matrix

$$A = \begin{bmatrix} 1 & -i & i \\ i & 1 & 0 \\ -i & 0 & 1 \end{bmatrix}$$

1. Why is the matrix A hermitian?
2. Find the hermitian form φ .
3. Find the hermitian quadratic form q associated with φ .
4. Using Gauss method, find the sum of squares of q .
5. Find the rank and signature of q .
6. Find the orthonormal basis B' for q and the formula $D = \bar{P}^t A P$.