

MAT216: Mathematics IV: Linear Algebra and Fourier Analysis

Assignment 2

Fall 2022

Total Marks: 25

1. Given the bases and n = . Now find the matrix P and P. [Let a, b and c be the last three digits of your Student ID.]
2. i) Find the value of a for the system and determine whether it has a trivial or nontrivial solution.

ax + y + z = 0

x + y − z = 0

x + y + az = 0

ii) Determine the following system,

x1 + x2 − x3 + 2x4 + x5 = 0

x1 + 2x2 − x3 + x4 + x5 = 0

2x1 + 3x2 − x3 + 2x4 + x5 = 0

4x1 + 5x2 − 2x3 + 5x4 + 2x5 = 0

1. Given the invertible matrix,

A =

Find the eigenvalues and eigenvectors of Aa+b+c and bI+A-1. [Let a, b and c be the last three digits of your Student ID.]

1. Find the eigenvalues and corresponding eigenvectors of *T* ∶ ℝ2 → ℝ2 where the transformation is given by T(x1, x2) = (2x1 – x2, −x1 + 2x2).
2. Also, find the trace and determinant of the matrix *A* =
3. What are the eigenvalues of *A × A* and *A-1*?
4. Determine whether *A* is diagonalizable. If it is, identify an invertible matrix *P*, such that *A* is diagonalizable and find *P-1AP.*