Tutorial letter 101/0/2024

Linear Algebra II

MAT2611

Year Module

Department of Mathematical Sciences

TUTORIAL RESOURCE FOR MAT2611

IMPORTANT INFORMATION:
This tutorial letter contains Assignment 8 for the module MAT2611

BAR CODE

ASSIGNMENT 08
Due date: Friday, 26 July 2024

Problem 29. Show the following:
(a) If A is an orthogonal matrix, then A^{-1} is also orthogonal matrix.
(b) If A and B are orthogonal matrices, then AB is also orthogonal matrix.

[10 marks]

Problem 30. What is the condition on a and b for which the matrix

$$\begin{bmatrix} a+2b & 2b-a \\ a-2b & 2b+a \end{bmatrix}$$

is orthogonal.

[10 marks]

Problem 31. Find a matrix P that orthogonally diagonalizes A, and determine $P^{-1}AP$,
where $A = \begin{bmatrix} 3 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 3 \end{bmatrix}$.

[10 marks]

Problem 32. Find the spectral decomposition of matrix

$$\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}.$$

[10 marks]

[Total: 40 marks]

– End of assignment –