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 4 for the module MAT2611

BAR CODE

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Problem 13. Find the coordinate vectors of v relative to the basis of set
$S = \{v_1, v_2\}$, where
    (a) $v = (5, -3)$; $v_1 = (1, 2)$, $v_2 = (1, 0)$.

    (b) $v = (a, b)$; $v_1 = (0, 2)$, $v_2 = (1, 1)$.

[10 marks]

Problem 14. Let U and V be two subspaces of $\mathbf{R}^5$ defined by

$$
\begin{aligned}
U &= \left\{(x_1, x_2, x_3, x_4, 0) \in \mathbf{R}^5 : x_1 = 2x_2 \text{ and } x_3 + x_4 = 0\right\} \text{ and} \\
V &= \left\{(x_1, x_2, x_3, x_4, x_5) \in \mathbf{R}^5 : x_1 + x_2 = 2x_3 \text{ and } x_4 = x_5\right\}.
\end{aligned}
$$

Find the bases of U and V.

[10 marks]

Problem 15. Determine whether the following form basis for P_2.
    (a) $1 + 2x - x^2$, $x + 4x^2$, $1 - x + 2x^2$

    (b) $1 + x$, $1 + x^2$, $x + x^2$

[10 marks]

Problem 16. Find the basis and dimension of the solution space of given homogeneous linear system.

$$
\begin{aligned}
x_1 + 3x_2 - x_3 + x_4 &= 0 \\
2x_1 + x_2 - 3x_3 + x_4 &= 0 \\
3x_1 + x_2 - x_3 + 2x_4 &= 0
\end{aligned}
$$

[10 marks]

[Total: 40 marks]

– End of assignment –