

銘傳大學 101 學年度研究所碩士班招生考試

電腦與通訊工程學系

第二節

「線性代數」試題

(第 / 頁共 / 頁) (限用答案本作答)

可使用計算機 不可使用計算機

1. Find the inverse (A^{-1}) of the matrix

$$A = \begin{bmatrix} 1 & -1 & 0 \\ 1 & 0 & -1 \\ -6 & 2 & 3 \end{bmatrix}. \quad (15\%)$$

2. Find the determinant ($|A|$) of the matrix

$$A = \begin{bmatrix} 0 & 2 & 1 \\ 3 & -1 & 2 \\ 4 & -4 & 1 \end{bmatrix}. \quad (15\%)$$

3. Find the solution of the system of linear equations $Ax=b$,

$$A = \begin{bmatrix} 1 & 0 & -2 & 1 \\ 3 & 1 & -5 & 0 \\ 1 & 2 & 0 & -5 \end{bmatrix}, \quad b = \begin{bmatrix} 5 \\ 8 \\ -9 \end{bmatrix}. \quad (15\%)$$

4. Find the transition matrix from B to B' for the following bases for R^2 ,

$$B = \{(-3, 2), (4, -2)\} \quad \text{and} \quad B' = \{(-1, 2), (2, -2)\}. \quad (10\%)$$

5. The vectors $v_1 = (0, 1, 0)$ and $v_2 = (1, 1, 1)$ spans a plane in R^3 . Find an orthonormal basis for this subspace (applying the Gram-Schmidt orthonormalization process). (10%)

6. Find the matrix A' for the linear transform $T: R^2 \rightarrow R^2$,

$$T(x_1, x_2) = (2x_1 - 2x_2, -x_1 + 3x_2),$$

relative to the basis $B' = \{(1, 0), (1, 1)\}$. (10%)

7. (a) Find the eigenvalues and corresponding eigenvectors of

$$A = \begin{bmatrix} 1 & -1 & -1 \\ 1 & 3 & 1 \\ -3 & 1 & -1 \end{bmatrix}. \quad (15\%)$$

- (b) Find a matrix P such that $P^{-1}AP$ is diagonal. (10%)

試題完
End of exam