資訊工程學系

銘傳大學九十三學年度 碩士班招生考試

資訊傳播工程學系

第四節 （第 | 頁共 > 頁）

線性代數 試題 （限用答案本作答）

一、Consider the linear system $\begin{aligned} a^2x &+ 3z = 1 \\ 5x + ay &+ 2z = 0 \\ 3x &+ z = 0 \end{aligned}$

For what values of a does the linear system have a unique solution? Also, use Cramer's rule to find the solution. 15%

二、Let $A = \begin{bmatrix} a & b & c \\ p & q & r \\ x & y & z \end{bmatrix}$ and $\det A = 3$, evaluate the determinant

(1) $\det(-2A)$ (2) $\det(A^{-1})$ (3) $\det(3A^{-1})^T$ (4) $\det(adjA)$

(5) $\det\begin{pmatrix} a+2p & -x & 3p \\ b+2q & -y & 3q \\ c+2r & -z & 3r \end{pmatrix}$ 15%

三、Prove or disprove that the matrix $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ has a LU-decomposition. 10%

四、Show that the set of all 3×3 symmetric matrices is a subspace W of all 3×3 matrices M_{33}. Find a basis for W. What is the dimension of W? 20%

五、Suppose that $L: R^2 \to R^3$ is linear transformation and that $L(1,2) = (8,4,3)$ and $L(3,4) = (18,6,7)$.

(1) Find the standard matrix representation A of L. 10%

(2) Is L one-to-one? 10%

線性代數 試題 （限用答案本作答）

六、**Orthogonally diagonalize the matrix** $A=\begin{bmatrix}-1 & -4 & -8\\ -4 & -7 & 4\\ -8 & 4 & -1\end{bmatrix}$**; that is to find matrices** P **and** D **such that** $A=PDP^{-1}$**.** **20%**

本試題係兩面印刷

試題完