

線性代數期中考練習題 範圍：Sec1.1-Sec2.2

- 請於 11/01(五)12:00 前繳至 B1102 統計系系辦
- 此份作業算一次小考成績請勿抄襲，只要被發現一律 0 分

Q1 The matrix of coefficient of the system of homogenous equations is  $\begin{bmatrix} 0 & 1 & -3 & 0 \\ 1 & 1 & -1 & 4 \\ 2 & -1 & 7 & 8 \end{bmatrix}$

- Solve the system of equations using the method of Gauss-Jordan elimination.  
(先列出增廣矩陣再做基本列運算化簡到簡約列梯形最後再列出一般解)
- Determine whether the set of general solution is subspace of  $\mathbb{R}^4$ .  
(請驗證子空間需滿足的所有條件再做判斷)
- Find the basis for subspace of solution.  
(請驗證基底需滿足的所有條件再做判斷)
- Give the dimension of the subspace and give a geometric description.

Q2 Determine whether the sets is subspace of  $\mathbb{R}^3$ . (Answer by T and F)

- |                  |                 |                   |                  |                         |
|------------------|-----------------|-------------------|------------------|-------------------------|
| a. $(a, b, a+b)$ | b. $(a, 2a, 0)$ | c. $(a, ab, b)$   | d. $(2a, 1, 2b)$ | e. $(a+b, a+c, 2a+b+c)$ |
| f. $(a, b^2)$    | g. $(a, 2, 0)$  | h. $(a, a, b, c)$ | i. $(a, a^2, b)$ | j. $(a+b, a+c, b+c, 0)$ |

Q3 Let  $B=\{u=(1,2,3), v=(0,-1,-2), w=(2,0,-1)\}$

- Is  $B$  a basis of  $\mathbb{R}^3$  (需做驗證)
- Find the linear combination  $(a,b,c) \in \mathbb{R}^3$  by  $u,v,w$ .
- Normalize  $u$ .
- Find the cosine of the angle between  $v$  and  $w$ .
- Find the distance between  $u$  and  $w$ .
- Find  $(p,q,r)$  such that are orthogonal to  $u$  and  $v$ .
- Find a basis for subspace of  $(p,q,r)$ .
- Give the dimension of the subspace and give a geometric description.

Q4 True or false. (Answer by T and F)

- The homogenous equations can have no solution.
- Any general solution can find the basis.
- Let the second column of matrix  $A$  are all zero. Let  $B$  be any matrix such that  $AB$  exists, then the second column of matrix  $AB$  are all zero.
- If  $I_n$  be an identity matrix, then  $AI_n=I_nA$  for any  $A$  be a  $m \times n$  matrix.
- If the element  $a_{ij}$  of matrix  $A$  lies above the main diagonal, then  $i < j$ .
- If  $A$  and  $B$  are diagonal matrices of the same size, then  $AB$  is also diagonal matrix.
- If  $A$  and  $B$  are idempotent matrices of the same size, then  $AB$  is also idempotent matrix.
- $X_1$  and  $X_2$  be the solution of  $AX=B$ , then  $A(X_1+2X_2)=B$ .
- If  $AX_1=B_1$  and  $AX_2=B_2$ , then  $A(X_1+2X_2)=B_1+B_2$ .
- If  $AX_1=B_1$  and  $AX_2=B_2$ , then  $A(X_1+X_2)=B_1+B_2$ .



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修課班級: \_\_\_\_\_ 學號: \_\_\_\_\_ 姓名: \_\_\_\_\_ 座號: \_\_\_\_\_

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- 此份作業算一次小考成績請勿抄襲，只要被發現一律 0 分
- 答案卷請雙面列印且翻轉長邊

Q1 a.

b.

**c.**

d.

Q2

[illegible]

Q3 a.

b.

**c.**

d.

e.

f.

g.

h.

Q4

[illegible]