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Unit 5 - Week 4 : unit 4

Course outline

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- Lecture 16 : Finding Null Space of a Matrix
- Lecture 17 : Solving $Ax=b$ when A is Singular
- Lecture 18 : Linear Independence and Spanning of a Subspace
- Lecture 19 : Basis and Dimension of a Vector Space
- Lecture 20 : Four Fundamental Subspaces of a Matrix
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Week 4 : Assignment 4

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2018-09-05, 23:59 IST.**

1) 1 point

If $A \cdot x = b$ has infinite solution $A \cdot x_p = b$ is the particular solution then any solution x expressed as

- a) $x = x_p + N(A)$
- b) $x = x_p + C(A^T)$
- c) $x = x_p + N(A^T)$
- d) None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

a) $x = x_p + N(A)$

2) 1 point

If $A = \begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$, find Nullspace of vector A (i. e $N(A)$)

- a) $\begin{bmatrix} -2 \\ 1 \end{bmatrix}$
- b) $\begin{bmatrix} 2 \\ 1 \end{bmatrix}$
- c) $\begin{bmatrix} 0 \\ 0 \end{bmatrix}$
- d) $\begin{bmatrix} 2c \\ d \end{bmatrix}$

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3) 1 point
 If x_1 & x_2 are two independent null space vectors of A then any vector in $N(A)$ can be expressed as

- a) C_1x_1
 b) $C_1x_1 + x_2$
 c) $C_1x_1 + C_2x_2$
 d) $x_1 - C_2x_2$

No, the answer is incorrect.

Score: 0

Accepted Answers:

c) $C_1x_1 + C_2x_2$

4) 1 point
 $A_{n \times n}$ in echelon matrix form gives m non-zero pivots. How many independent vectors are required to describe $N(A)$

- a) m
 b) n
 c) $n-m$
 d) $m-n$

No, the answer is incorrect.

Score: 0

Accepted Answers:

c) $n-m$

5) 1 point
 Two vectors are given as $\begin{bmatrix} a \\ b \\ c \end{bmatrix}$ and $\begin{bmatrix} d \\ e \\ f \end{bmatrix}$. They are linearly dependent vectors if

- a) $a/d = b/e$
 b) $a+d = b+e = c+f$
 c) $ad = be = cf$
 d) a, b, c are all zero

No, the answer is incorrect.

Score: 0

Accepted Answers:

d) a, b, c are all zero

6) If A has all independent columns, what can be said $Ax=b$ 0 points

- a) Unique solution
 b) Solution exists for certain condition of b
 c) Infinite solution
 d) None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

a) Unique solution

7) If subspace in R^n has m basis vectors. then**1 point**

- a) $m \geq n$
- b) $m \leq n$
- c) $m+n=\infty$
- d) $m=n$ only

No, the answer is incorrect.**Score: 0****Accepted Answers:**b) $m \leq n$

8)

1 pointThe span of three vectors $\begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$, $\begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$ and $\begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$ gives

- a) Subspace of R^3 or solid
- b) Subspace of R^1 or line
- c) Subspace of R^2 or plane
- d) None of the above

No, the answer is incorrect.**Score: 0****Accepted Answers:**

d) None of the above

9)

1 point

$$Ax = b \text{ with } A = \begin{bmatrix} 1 & 0 & 2 & 3 \\ 1 & 3 & 2 & 0 \\ 2 & 0 & 4 & 9 \end{bmatrix}, x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} \text{ and } b = \begin{bmatrix} 2 \\ 5 \\ 10 \end{bmatrix}$$

Find the complete solution ($x = x_n + x_p$).

- a) $x = \begin{bmatrix} 0 \\ 3 \\ 0 \\ 2 \end{bmatrix} + x_3 \begin{bmatrix} -2 \\ 0 \\ 1 \\ 0 \end{bmatrix}$
- b) $x = \begin{bmatrix} -4 \\ 3 \\ 0 \\ 2 \end{bmatrix} + x_3 \begin{bmatrix} -2 \\ 0 \\ 1 \\ 0 \end{bmatrix}$
- c) $x = \begin{bmatrix} 4 \\ 3 \\ 0 \\ 2 \end{bmatrix} + x_3 \begin{bmatrix} -2 \\ 0 \\ 1 \\ 0 \end{bmatrix}$

d) $x = \begin{bmatrix} 3 \\ 0 \\ 2 \\ 0 \end{bmatrix} + x_3 \begin{bmatrix} -2 \\ 0 \\ 1 \\ 0 \end{bmatrix}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

b) $x = \begin{bmatrix} -4 \\ 3 \\ 0 \\ 2 \end{bmatrix} + x_3 \begin{bmatrix} -2 \\ 0 \\ 1 \\ 0 \end{bmatrix}$

¹⁰ Check whether $Ax=b$ is solvable

1 point

$$A = \begin{bmatrix} 1 & 2 & 3 & 5 \\ 2 & 4 & 8 & 12 \\ 3 & 6 & 7 & 13 \end{bmatrix} \quad b = \begin{bmatrix} 2 \\ 2 \\ 5 \end{bmatrix}$$

- (a) Solvable with infinite solution
- (b) Solvable with unique solution
- (c) No solution
- (d) b must be in R^4

No, the answer is incorrect.

Score: 0

Accepted Answers:

(c) No solution

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