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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » Data Science for Engineers (course)



## Course outline

About NPTEL ()

How does an NPTEL online course work? ()

Setup Guide ()

Pre Course Material ()

Week 0 ()

Week 1 ()

Week 2 ()

- Linear Algebra for Data science (unit? unit=36&lesso n=37)
- Solving Linear Equations (unit?

## Week 2: Assignment 2

The due date for submitting this assignment has passed.

Due on 2024-08-07, 23:59 IST.

Assignment submitted on 2024-08-07, 22:22 IST

- 1) Are the vectors  $\begin{bmatrix} -2 \\ 4 \end{bmatrix}$ ,  $\begin{bmatrix} 7 \\ -2 \end{bmatrix}$  and  $\begin{bmatrix} 3 \\ -6 \end{bmatrix}$  linearly independent?
- 1 point

- O Yes
- No

Yes, the answer is correct.

Score: 1

Accepted Answers:

No

2) Does the set,  $S=\left\{ \left(1,1\right),\left(1,2\right)
ight\}$  spans  $\mathbb{R}^{2}$ ?

1 point

- Yes
- O No

Yes, the answer is correct.

Score: 1

Accepted Answers:

Yes

3) Consider the following system of linear equations of the form Ax=b:

1 point

$$2x - 3y + 6z = 14$$
  
 $x + y - 2z = -3$ 

Which among the following are correct?

unit=36&lesso n=38)

- Solving Linear Equations ( Continued ) (unit? unit=36&lesso n=39)
- Linear Algebra

  Distance, Hype rplanes and Halfspaces, Eige envalues, Eige nvectors (unit? unit=36&lesso n=40)
- Linear Algebra

  Distance, Hype rplanes and Halfspaces, Eig envalues, Eige nvectors (
  Continued 1) (unit? unit=36&lesso

n=41)

- Linear Algebra

  Distance, Hype rplanes and Halfspaces, Eige envalues, Eige nvectors (
  Continued 2) (unit? unit=36&lesso n=42)
- Linear Algebra

  Distance, Hype rplanes and Halfspaces, Eige envalues, Eige nvectors (Continued 3) (unit? unit=36&lesso n=43)
- Common doubts asked on Linear

$$\left[egin{array}{c} 1 \ -4 \ 0 \end{array}
ight]$$
 is a solution to  $Ax=b$ 

$$\left[egin{array}{c} 0 \ 2 \ 1 \end{array}
ight]$$
 is a solution to  $Ax=b$ 

$$\left[egin{array}{c} 1 \ -4 \ 0 \end{array}
ight]$$
 is a solution to  $Ax=0$ 

$$\left[egin{array}{c} 0 \ 2 \ 1 \end{array}
ight]$$
 is a solution to  $Ax=0$ 

Yes, the answer is correct.

Score: 1

Accepted Answers:

$$\left[egin{array}{c} 1 \ -4 \ 0 \end{array}
ight]$$
 is a solution to  $Ax=b$   $\left[egin{array}{c} 0 \ 2 \ 1 \end{array}
ight]$  is a solution to  $Ax=0$ 

Consider the following system of linear equation:

$$x + y + z = -2$$
  
 $x + 2y - z = 1$   
 $2x + ay + bz = 2$ 

4) Find the conditions on a and b for which the above system has no solution. 1 **point** 

$$2a + b - 6 = 0$$
 $a \neq 4, 2a + b - 6 = 0$ 
 $a = 4, b = -2$ 
 $2a + b - 6 \neq 0$ 

Yes, the answer is correct.

Score: 1

Accepted Answers:

$$a \neq 4, 2a + b - 6 = 0$$

5) Find the conditions on a and b for which the above system has a unique solution. **1** poi

$$2a + b - 6 = 0$$
 $a \neq 4, 2a + b - 6 = 0$ 
 $a = 4, b = -2$ 
 $2a + b - 6 \neq 0$ 

Algebra (unit? unit=36&lesso n=44)

- Quiz: Week 2: Assignment2(assessment?name=215)
- Week 2
  Feedback
  Form: Data
  Science for
  Engineers
  (unit?
  unit=36&lesso
  n=154)

Week 3 ()

Week 4 ()

Week 5 ()

Week 6 ()

Week 7 ()

Week 8 ()

Text Transcripts ()

Download Videos ()

Books ()

Problem Solving Session -July 2024 () Yes, the answer is correct.

Score: 1

Accepted Answers:

$$2a+b-6 
eq 0$$

6) Find the conditions on a and b for which the above system has infite number of **1** point solutions.

$$2a+b-6=0 \ a 
eq 4, 2a+b-6=0 \ a = 4, b = -2 \ 2a+b-6 
eq 0$$

Yes, the answer is correct.

Score: 1

Accepted Answers:

$$a=4,b=-2$$

Based on the given information, answer questions 7 and 8.

In solving the system Ax=b in the variables x1,x2,x3 and x4, Gaussian elimination on the Augmented matrix  $[A\mid b]$  led to the following row echelon form

$$\begin{pmatrix}
1 & 0 & 0 & 3 & 2 \\
0 & 1 & 1 & 2 & 3 \\
0 & 0 & 0 & 1 & 1/3 \\
0 & 0 & 0 & 0 & 0
\end{pmatrix}$$

7) Identify the number of free variable from the above rwo echelon matrix.

1 point

- 0
- **1**
- 2
- **3**

Yes, the answer is correct.

Score: 1

Accepted Answers:

1

8) Which among the following is correct for the above system Ax = b?

1 point

- It has infinite number of solutions.
- It has a unique solution.
- It has no solution.

Yes, the answer is correct.

Score: 1

Accepted Answers:

It has infinite number of solutions.

For what values of a are matrix A =  $\begin{bmatrix} a & 1 \\ -2 & a+3 \end{bmatrix}$  not invertible?

a = 1	
✓ a = -2	
✓ a = -1	
a = 2	
Yes, the answer is correct. Score: 1	
Accepted Answers:	
a = -2 a = -1	
10) Which among the following is true for the determinant of a matrix?	1 point
The determinant of a diagonal matrix is the product of its diagonal entries.	
☐ If one row of a matrix is a scalar multiple of another, the determinant is 1	
If one row of a matrix is a scalar multiple of another, the determinant is 0.	
☐ The determinant of a permutation matrix can only be 1.	
Yes, the answer is correct. Score: 1	
Accepted Answers:	
The determinant of a diagonal matrix is the product of its diagonal entries.	
If one row of a matrix is a scalar multiple of another, the determinant is 0.	
11) Which among the following are the eigenvalues of matrix $A=\begin{pmatrix}5&8&16\\4&1&8\\-4&-4&-11\end{pmatrix}$ ?.	1 point
<ul><li>○ 1, 3, -3</li><li>○ 1, 3, 3</li></ul>	
○ -1, 3, 3 ○ -1, 3, 3	
<ul><li>□ 1, -3, -3</li></ul>	
Yes, the answer is correct. Score: 1	
Accepted Answers:	
1, -3, -3	
12) $\begin{bmatrix} 1 & -3 & -2 & 4 \end{bmatrix}$	
Find the nullity of $A=\begin{bmatrix}1&-3&-2&4\\1&-3&1&1\\0&0&1&-1\end{bmatrix}$ .	
$\begin{bmatrix} 0 & 0 & 1 & -1 \end{bmatrix}$	
2	
Yes, the answer is correct. Score: 1	
Accepted Answers:	
(Type: Numeric) 2	
	1 point

1 point

13)

. Suppose the eigen values corresponding to  $AA^{T}$  are  $a,\,b$  and  $c,\,$  then find

the value of ab + bc + ca.

9

0

81

**18** 

Yes, the answer is correct. Score: 1

Accepted Answers: