

Unit 7 - Week 5

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

Week 3

week 4

Week 5

- Eigenvalues and Eigenvectors
 - Linear Algebra : Basic Definitions
 - Eigenvalue Decompositon
 - Principal Component Analysis and its Interpretations
 - PCA : Interpretation 2
 - PCA : Interpretation 3
 - PCA : Interpretation 3 (Contd.)
 - PCA : Practical Example
 - Singular Value Decomposition
 - Lecture Material for Week 5
- Quiz : Assignment 5
- Week 5 Feedback

Week 6

Week 7

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week 10

Week 11

Week 12

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Assignment 5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-04, 23:59 IST.

- 1) If X is a matrix whose columns are zero mean, then the covariance matrix Σ is givenby:1 point
- ☐ $\frac{1}{m}X^T X$

☐ $\frac{1}{m}X^{-1} X$

☐ $\frac{1}{m}X X^{-1}$

☐ $\frac{1}{m}X X^T$
- No, the answer is incorrect.
Score: 0
Accepted Answers:
 $\frac{1}{m}X^T X$
- 2) Consider the following vectors,1 point
- $$\begin{bmatrix} 3 \\ 5 \\ 7 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 2 \end{bmatrix} \begin{bmatrix} 4 \\ 7 \\ 4 \end{bmatrix}$$

Are these vectors basis for R^3 ?

☐ Yes

☐ No
- No, the answer is incorrect.
Score: 0
Accepted Answers:
Yes
- 3) Compute the Correlation between A and B.1 point
- | A | B |
|----|----|
| 11 | 15 |
| 12 | 30 |
| 15 | 14 |
| 17 | 14 |
| 21 | 34 |
- ☐ 0.786
- ☐ 0.123
- ☐ 0.812
- ☐ 0.384
- ☐ None

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.3844) Recall Eigenvalue decomposition, in which of the following condition does U^{-1} exists?1 point☐ If the columns of U are linearly independent☐ If the columns of U are linearly dependent☐ If the columns of U are either linearly dependent or linearly independent☐ None of theseNo, the answer is incorrect.
Score: 0
Accepted Answers:
If the columns of U are linearly independent5) A matrix M is called stochastic matrix if all the entries are positive and sum of the elements in each column is equal to __.1 point☐ 1☐ $\sqrt{2}$ ☐ 0☐ -1No, the answer is incorrect.
Score: 0
Accepted Answers:
1

6) Consider the following data:1 point

x	y	z
0.5	1.5	1.4
0.65	0.98	0.98
0.54	0	0.12
0.25	0.59	0.6
0.82	2	2
0.74	0.89	0.89
0.26	0.53	0.52
0.46	0.26	0.27
0.38	0.97	0.95
1	1	1

Is column z adding any new information to the data?

☐ Yes☐ NoNo, the answer is incorrect.
Score: 0
Accepted Answers:
No

7) For the data given in question no.6, What is the correlation between y and z?1 point

☐ 0.5☐ 1.01☐ 0.997☐ 0.1No, the answer is incorrect.
Score: 0
Accepted Answers:
0.9978) If λ_d is the dominant eigenvalue of a matrix, what would happen to the sequence x_0, Ax_0, A^2x_0, \dots if1 point

I. $ \lambda_d > 1$	a. will vanish
II. $ \lambda_d < 1$	b. will reach a steady state
III. $ \lambda_d = 1$	c. will explode

☐ I-c, II-a, III-b☐ I-a, II-b, III-c☐ I-c, II-b, III-a☐ None of theseNo, the answer is incorrect.
Score: 0
Accepted Answers:
I-c, II-a, III-b

9) Time complexity of Gaussian elimination is _____.1 point

☐ $O(n^2)$ ☐ $O(n^3)$ ☐ $O(n)$ ☐ None of theseNo, the answer is incorrect.
Score: 0
Accepted Answers:
 $O(n^3)$

10) Which of the following is the most dominant eigen value?1 point

☐ 6☐ 3☐ -20☐ 10No, the answer is incorrect.
Score: 0
Accepted Answers:
-20