

Assignment 5 (Week 5)

Due on 2016-03-01, 19:29 IST

Submitted assignment

1) The exponent of multivariate normal density function is-

1 point

- ☒ $(-)0.5\{(X-\mu)^T|\sum^{-1}(X-\mu)\}$
- ☐ $(-)0.5\{(X-\mu)\sum^{-1}(X-\mu)^T\}$
- ☐ $(-)0.5\{(X-\mu)\sum^{-1}(X-\mu)^{-T}\}$
- ☐ $(-)0.5\{(X-\mu)^1|\sum|(X-\mu)^T\}$

2) The exponent of multivariate normal density function follows-

1 point

- ☐ F-distribution
- ☐ t- distribution
- ☒ Chi-square distribution
- ☐ None of these

3) A process is $X \sim N_2(\mu, \Sigma)$ is designed to produce laminar aluminium sheet of length x_1 and breadth x_2 with the following popular parameters. Obtain its bivariate normal distribution function based on given data.

3 points

$$\mu = \begin{pmatrix} \mu_1 \\ \mu_2 \end{pmatrix} = \begin{pmatrix} 90 \\ 40 \end{pmatrix} \text{ and } \Sigma = \begin{pmatrix} \sigma_1^2 & \sigma_{12} \\ \sigma_{12} & \sigma_2^2 \end{pmatrix} = \begin{pmatrix} 9 & 0 \\ 0 & 4 \end{pmatrix}$$



$$0.0265e^{[-0.0139(4(x_1 - 90)^2 + 9(x_2 - 40)^2)]}$$



$$10.0265e^{[-0.0139(4(x_1 - 90)^2) + 9(x_2 - 40)^2)]}$$



$$9.0265e^{[-0.0139(4(x_1 - 90)^2) + 9(x_2 - 40)^2)]}$$



None of these

- 4) The following ten bivariate random observations were collected from a population.

1 point

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 52 & 56 & 43 & 53 & 51 & 46 & 49 & 51 & 61 & 58 \\ 26 & 28 & 28 & 25 & 30 & 37 & 27 & 31 & 26 & 32 \end{bmatrix}$$

Find out \bar{X}_1 and \bar{X}_2



[52, 29]



[50, 29]



[55, 25]



None of these

- 5) Based on the data set given on Q. 4, calculate inverse of S (where S is a sample covariance matrix)

2 points



$$\begin{bmatrix} 0.0378 & 0.0170 \\ 0.0170 & 0.0839 \end{bmatrix}$$



$$\begin{bmatrix} 10.1378 & 0.0170 \\ 0.0170 & 0.1839 \end{bmatrix}$$



$$\begin{bmatrix} 1.0378 & 0.9170 \\ 0.9170 & 1.0839 \end{bmatrix}$$



$$\begin{bmatrix} 0.0378 & 10.0170 \\ 10.0170 & 0.0839 \end{bmatrix}$$

6) Is the population bivariate normal, based on the data given in Question no. 4

2 points



No



Yes



Cannot be answered based on the data set given

7) Which of the following methods we used to test the bivariate normality of a given data set.

1 point



Q-Q plot



Residual versus predicted values



Probability plot



Both (i) and (iii)



Both (i) and (ii)

8) Choose the correct method to detect multivariate outliers.

2 points



Modified Leven test



Chi-square Q-Q test



Bonferroni test



All of these



None of these

9) Choose the correct value of index parameter, λ , which is used for transforming data into normal shape.

1 point



0



1

☐ 0.5

☐ -0.5

10) Choose the correct range of index parameter, λ of Box-Cox power transformation.

1 point

☐ 0 to (+)1

☐ (-)1 to (+)1

☐ (-)3 to (+)3

☒ (-)5 to (+)5

11) Choose the correct value of $y(\lambda)$, when $\lambda=0$ for all positive data.

1 point

☐ 1

☐ 0

☐ ∞

☒ $\log(y)$

☐ None of these