Assignment 10 (Week 10)

Submitted assignment

1) The goal of performing Principal Component Analysis (PCA) is-   *1 point*

   ◉ to explain variance-covariance structure of a large set of variables through a few linear combinations of these variables.

   ○ to explain only variance structure of a large set of variables through a few linear combinations of these variables.

   ○ to explain only covariance structure of a large set of variables through a few linear combinations of these variables.

   ○ to explain variance-covariance structure of a large set of variables through a few nonlinear combinations of these variables.

   ○ None of these.

2) Consider the following sample covariance matrix.   *2 points*

$$S = \begin{bmatrix} 100 & 60 \\ 60 & 64 \end{bmatrix}$$

The sample correlation matrix R is-

   ○

   $$S = \begin{bmatrix} -1 & 1 \\ 1 & -1 \end{bmatrix}$$

   ○

   .

$$S = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$$

○

$$S = \begin{bmatrix} 1.00 & 0.75 \\ 0.75 & 1.00 \end{bmatrix}$$

⦿ None of these.

3) Based on the data given in Q2, choose the correct percentage of variance explained by first principal component.   ***3 points***

○ 70%

○ 74%

○ 80%

⦿ 88%

4) Consider the following samples co-variance matrix   ***3 points***

$$S = \begin{bmatrix} 100 & 55 \\ 55 & 36 \end{bmatrix}, \text{ here sample size (n)} = 50.$$

Based on the data given, choose the correct Eigen values

⦿ (131.63, 4.37)

○ (123.22, 8.26)

○ (135.56, 6.25)

○ (145.55, 3.37)

5) Based on the data given in Q4, choose the correct 95% confidence interval for the population variance (for PC 1).   ***3 points***

○

$88.29 < \theta_1 < 150.92|$

⦿

$94.29 < \theta_1 < 217.92|$

○

$80.29 < \theta_1 < 217.92|$

○

$90.29 < \theta_1 < 117.92$|

6) Based on the data given in question 4, conduct the Bartlett's sphericity test and choose the correct option given below: *2 points*

○ Null hypothesis is rejected

◉ Null hypothesis is accepted

○ Sufficient data is not available

7) Choose the correct option: *1 point*

○ Scree plot is used to extract the principal components to be retained.

○ Bartlett's test is used to extract the principal components to be retained

◉ Both of these

○ None of these