

PSYC 943: Fundamentals of Multivariate Modeling

Homework #4 (Total 10 Points)

Due: Friday, October 4, 2013 at 12pm.

Instructions: The data for these assignment were simulated loosely based on a classic data set used to demonstrate a classic classification problem, [the Iris Flower data set](#). Measurements were taken for 5 genetically-modified flowers from the *setosa* species along 2 dimensions: sepal length and sepal width. Use the flower data in your individual data file and SAS PROC IML (or some other program's matrix algebra system) to answer the following questions. Please note that the first column for FlowerID should not be used as data!

For variance and covariance estimates, use a denominator of N rather than N-1. For questions 6-10, please use the mean vector and covariance matrix found from questions 1 and 2.

All questions are worth 1 point.

1. What is the mean vector for these data?
2. What is the covariance matrix for these data?
3. What is the determinant of the covariance matrix for these data?
4. Is the covariance matrix invertible? How did you come to this conclusion?
5. If #4 is yes, what is the inverse covariance matrix?
6. What is the difference between the observations of FlowerID = 1 and the mean vector?
7. What is the likelihood from this multivariate normal distribution for FlowerID=1?
8. What is the likelihood from this multivariate normal distribution for FlowerID=2?
9. What is the log-likelihood of the sample from this multivariate normal distribution?
10. What is the -2 log-likelihood of the sample from this multivariate normal distribution?

Submission Instructions:

All homework and final answers must be your own and not be copied or paraphrased from anyone else's answers. Homework must be submitted via email (jtemplin@unl.edu) in the form of Microsoft Word document with the name: 943_FirstLast_HW#.docx. Late homework will have a penalty of 10% per calendar day.