**Chapter 6 Practice Problems - Calculations**

**Conduct all tests at  = 0.05 significance level**

Q.1. **Paired Comparison**



p.1.a. Compute Hotelling’s T2 statistic to test H0: ****

p.1.b. Obtain 95% Simultaneous Confidence Intervals for Individual Means Differences (eq. 6-10).

p.1.c. Obtain Bonferroni simultaneous 95% Confidence Intervalsfor individual mean differences (eq. 6-10a).

Q.2. **2-Way MANOVA**

For Device 1, the mean reading time was 1250 seconds and the mean comprehension accuracy was 65.0%. For Devices 2 and 3 the means were (1030, 62.5), and (1020, 60), respectively.

p.2.a. Compute the matrix of sums of squares and cross-products for devices, and give its degrees of freedom.

p.2.b. Let  where SSCPRES is the Residual Sums of Squares and Cross-products. How large would  need to be to reject the null hypothesis of no Device effects, based on the Chi-square version of the test?

Q.3. **Hotelling’s T2**



p.3.a. Test H0: ****

p.3.b. Obtain Bonferroni Simultaneous Confidence Intervals for 1i - 2i

Q.4. **Paired Comparison**

WNBA (In class) Data: (For this data, n = 107).



p.4.a. Compute Hotelling’s T2 statistic to test H0: ****

p.5.b. Obtain 95% Simultaneous Confidence Intervals for Individual Means Differences (eq. 6-10).

p.5.c. Obtain Bonferroni simultaneous 95% Confidence Intervalsfor individual mean differences (eq. 6-10a).

Q.5. **Repeated Measures/Growth Curves**



p.5.a. Based on the ML/EGLS estimators given above (linear trend model), give the predicted values for each group and each number of washings (0,1,2,3,4,5)

p.5.b. Test whether the slopes for the 2 treatments are equal (use N-g=20-2=18 degrees of freedom).

Q.6. **Profile Analysis**

p.6.a. Give a matrix C1 that could be used to test for parallel profiles.



p.6.b. Test whether the 2 brands have (population) parallel profiles.

p.6.c. Assuming parallel profiles, test whether profiles are concurrent.

Q.7. **1-Way MANOVA** (g=11,p=2,n=6)



p.7.a. Compute  Note: SSCP\_Err = **W** and SSCP\_Trt = **B**

p.7.b. Test H0: ************ (Use Case 2, Table 6.3, p.303 and the chi-square test: eqn 6-44)

p.7.c. Give the t\*SE terms for each variable for Bonferroni’s method for comparing all pairs of means (Result 6.5)

Q.8.  **Hoteeling’s T2**



p.8.a. Test H0: ****

p.8.b. Obtain Simultaneous 95% Confidence Intervals for differences in means for all 3 measurements.

p.8.c. Repeat p.8.b. for Bonferroni Simultaneous 95% Confidence Intervals

Q.9. **Repeated Measures/Growth Curves**



p.9.a. Give the fitted growth curve for each treatment (as a function of time).

p.9.b. Test the hypothesis that the quadratic growth curve is adequate (despite the fact that these are not large samples).

Q.10. **2-Way MANOVA**

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p.10.a. Test for interaction effects between Balance and Color

p.10.b. Test for main effects of Balance and color

Q.11. **Paired Comparisons**



p.11.a. Test H0: ****

p.11.b. Obtain Simultaneous 95% Confidence Intervals for the population mean difference for all 4 characteristics (both versions).

Q.12. **Repeated Measures for Comparing Treatments**

p.l2.a. Give the **C** matrix for testing 



p.12.b. Compute 



p.12.c. Compute the test statistic and rejection region for the test in p.12.a.

Q.13. **2-Way MANOVA**



Compute the sums of squares and cross product matricdes for: Base Diet, Methionine, and their interaction.