Multivariate Data Analysis. Home Assignment 4

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On the Cambro page, you can find the file Knee.xlsx with data from a medical study involving patients with knee injuries and a control group. Please choose the appropriate tests to investigate the following questions and draw your conclusions:

Task 1: Consider the four variables that measure strengths in Quadriceps and Hamstrings (both concentric and eccentric). Test simultaneously if there is a difference **between the injured and non-injured knees** for the two treatment groups, separately. If there is a significant difference, which variables are significantly different? (Paired comparisons)

Task 2: Consider the non-injured/dominant legs for all subjects. Test if there are a difference **between the first, second and third trials for the long jumps simultaneously**. If there is a significant difference, do pairwise comparisons among different trails. (Repeated measures)

Task 3: Consider the four variables Quadriceps and Hamstrings (both concentric and eccentric) for the injured/non-dominant knees for all subjects. Conduct a MANOVA to **test if the Treatment group and Gender affect the responses**. If significant results are found, proceed with appropriate univariate analyses. (MANOVA)

Task 4 (Optional[1]): Consider the four variables that measure strengths in Quadriceps and Hamstrings (both concentric and eccentric) in the injured knees. Test if there is a difference **between the two treatment groups**. If there is a difference between treatment groups, find out between which variables there are differences. (Comparisons between two populations [2])

[1] It means this question will not be counted in the total score.

[2] This part is not included in my slides. You can read the textbook, section 6.3, page 284-296.

Suggested contents in your report:

- Pre-study, for example, checking normality assumption and detecting potential outliers.
- Present the model, null hypothesis, test statistics, and results
- Discussion and Conclusion.