

## Homework 2: Data Statistics

Due September 11, 2018 at 2:10 PM

The file `hwkdata.mat` contains data related to body measurements and estimated body fat percentage. The matrix  $x$  contains 14 predictor variables:

1. Age (yrs)
2. Weight (lbs)
3. Height (inches)
4. Adiposity Index ( $\text{kg}/\text{m}^2$ )
5. Neck circumference (cm)
6. Chest circumference (cm)
7. Abdomen circumference (cm)
8. Hip circumference (cm)
9. Thigh circumference (cm)
10. Knee circumference (cm)
11. Ankle circumference (cm)
12. Extended bicep circumference (cm)
13. Forearm circumference (cm)
14. Wrist circumference (cm)

The column vector  $y$  contains the output variable, percent body fat, calculated according to Brozek's equation  $457/\text{Density} - 414.2$ . The correct citation for these data is: Penrose, K., Nelson, A., and Fisher, A. (1985), "Generalized Body Composition Prediction Equation for Men Using Simple Measurement Techniques", *Medicine and Science in Sports and Exercise*, 17(2), 189.

In this homework, you'll explore the data through various statistical analyses.

For each variable in  $x$  and  $y$ , calculate the maximum, minimum, mean, median, 20% trimmed mean, standard deviation, variance, skewness, kurtosis. Determine if the signals are univariate normally distributed. Identify any outliers in the data. Think about a compact way to present these results (Hint: it's not a figure).

Evaluate the covariance and correlation of the input variables ( $x$ ). Evaluate the correlation of the input variables ( $x$ ) to the output variable ( $y$ ).

For this homework, prepare a written report in IEEE format. Focus on writing the abstract, introduction, and results; you do not need to describe how each statistic is calculated (so you won't have a methodology section). Discuss the results of your statistical analysis and draw some conclusions about what it means for your data. Include any plots and tables that will support your findings. Make sure you correctly label your figures and tables and refer to them in the text. Include an appropriate citation for the data, with an internal citation in the text and a full reference in the list of references. Include all your code in an appendix (single column) at the end of the report. Convert your report to .pdf before submitting it through Canvas.