

# MAT453 - ASSIGNMENT 9

Spring 2025

Assignment Due (by 11:59 P.M.): Sunday, April 6th

**Directions:** You may discuss the exercises with other students and with the instructor, but the work you turn in must be your own. You will need to submit your R code and answers to the questions below in **one** word or pdf file.

**Exercises:** (10 points total) We continue to explore linear mixed model in this assignment. Run the R command below to obtain the dataset:

```
exer <- read.csv("https://stats.idre.ucla.edu/stat/data/exer.csv")
## Convert variables to factor
exer <- within(exer, {
  diet <- factor(diet)
  exertype <- factor(exertype)
  time <- factor(time)
  id <- factor(id)
})
```

Then:

1. Recall the Spaghetti plot created last time. Can you create a similar plot to visualize the interaction effect between time, diet and exertype on pulse?
2. Fit a linear regression model (i.e., `lm`) to predict pulse from time, diet, exertype, time \* diet, and time \* exertype. Which predictors are significant?
3. Fit a linear mixed model (i.e., `lmer` from package *lme4*) to use time, diet, exertype \* diet, and exertype as fixed effects and a random intercept for each id.
4. Fit a linear mixed model (i.e., `lmer` from package *lme4*) to use time, diet, exertype \* diet, and exertype as fixed effects and a random intercept and a random slope of time for each id. Compare the fitted model to the Spaghetti plots. What can you conclude?