This project contains a simulation and data analysis component. The data analyses component uses the “MVPA_seasonal.csv” dataset. See “2023_PhD_qual_Q4.pdf” for an overview of the data.

The goals of this project are to (1) perform a data analysis involving correlated, non-Gaussian data and (2) identify the impact of model misspecification on analyses using a simulation study. The first goal will be addressed by following the prompt and questions presented in “2023_PhD_qual_Q4.pdf”. The scope of the simulation component is as follows. Assume the parameters obtained from the GLMM estimated in Q4(f) define the “true” data generating mechanism. Evaluate the effect of two forms of model misspecification on the quantities of interest to the investigators. Specifically, evaluate the impact of (1) mis-specifying the subject-specific effect functional form as a random intercept and (linear) slope, but with the correct mean model and (2) mis-specifying both the functional form for both the mean model and the subject-specific effect, again as an intercept and (linear) slope. Compare the results of your misspecified models to a correctly specified model. Evaluate models using point-wise mean squared error, coverage rates for point-wise 95% confidence intervals, and point-wise bias for the estimated fixed effect.

For this assignment, you only need to write a brief methods and results section (no background or discussion/conclusion), using tables and figures to support the claims made in your results section. The write-up should be a maximum of 2 pages double-spaced.

Note: you are not responsible for providing a set of responses to the questions in completing the “2023_PhD_qual_Q4.pdf” document. We will work through (a)-(f). It is recommended you attempt to complete the remaining sub-questions as practice for the qualifying exam, though this can be done in your own time.