STA 542 – Homework 5

Due: Wednesday, October 21, at the start of class

Credit. This homework is graded for effort rather than correctness. A substantive attempt addresses every assigned part, shows the reasoning behind each answer, and interprets any computational output. Full effort credit does not require a correct solution: show what you tried, including unsuccessful approaches, and identify precisely where you remain stuck.

Submission. Submit one ordered hard copy, secured with a staple or paper clip, with your name clearly written on the first page. Mathematical and statistical reasoning must be written legibly by hand; tablet handwriting is welcome. R code, numerical output, tables, and plots may be printed and appended, or sketched when exact output is unnecessary. Label every computational exhibit, refer to it in the handwritten response, and explain what it shows.

Download and unzip `cointegration-workbook.zip`. Open `cointegration-workbook.html`, keeping its `data` folder beside it. The workbook contains the complete questions, data descriptions, and observations. Workbook 10 supplies the definitions and prediction argument; Workbook 9 supplies the KPSS procedure.

Problems

Problem 1. Complete Problem 1(a)–(e), *Investigating Stationary Relations*, in *Cointegration in Real Data*, for all four pairs: Coca-Cola/PepsiCo, wheat/corn, grain freight to Japan, and cheese production/yen per dollar. Use the specified log scales and regression directions. Give the diagnostic figures and tables requested in the workbook and a short assessment of each pair. Ordinary KPSS critical values do not calibrate a test on OLS-fitted residuals; follow the distinction made in the question.

Problem 2. Complete Problem 2(a)–(e), *Deriving a Pairs Trade*, in the same workbook. Explain the trading idea and derive the WEC/Xcel holdings before opening the evaluation data, then apply the fixed rule to the eight prescribed trades. Submit the derivation, one eight-row results table with totals, and the interpretation.

Acknowledgments. List collaborators and any material assistance, including AI tools, with the problem on which the assistance was used. Direct deadline or extension questions to a TA.