Exercise: exponential smoothing II

Earlham College
BUS 323 - Fall 2025 - Labadie

In this activity, you will practice employing exponential smoothing methods using datasets in the `fpp3` package, and evaluating forecast accuracy based on forecast errors. Please turn in your code with answers in comments, or a document with your answers and plots (Word doc or a PDF generated from Markdown, for example).

1. Use the `aus_holidays` dataset.

   (a) Obtain total overnight trips for the purpose of going on holiday. Fit both a multiplicative and additive Holt-Winters model. Produce forecasts for three years into the future. Plot the historical data and the forecasts, and evaluate the accuracy of each model. Plot each component of the model.

2. Compare `ETS()`, `SNAIVE()` and textttdecomposition_model(STL, ???) on the following time series. You might need to use a Box-Cox transformation for the STL decomposition forecasts. Use a test set of three years to decide what gives the best forecasts.

   (a) Beer and bricks production from `aus_production`.

   (b) Cost of drug subsidies for diabetes (`ATC2 == "A10"`) and corticosteroids (`ATC2 == "H02"`) from `PBS`.

   (c) Total food retailing turnover for Australia from `aus_retail`.