Assignment #9

Principle component analysis

Required materials: Python

Directions:

Consider the term structure of interest rates given by the 1-month, 3-month, 2-year, 5-year, 7-year, 10-year, and 30-year treasury bills/bonds. Collect the trailing 5 years of monthly data for each of these treasury series.

1. Estimate the sample covariance matrix for the treasury securities
2. Calculate the first 3 principle components.
3. Using these 3 principle components from part 2, create the 3 factor series.
    a. Plot the 3 factor time series
4. Simulate 1 5-year path for each of the treasury series using their respective factor loadings on the 3 principle component factors.