Exercises – Week #38

Introduction to Financial Engineering

Note: You may choose to work in R or Matlab. Sometimes solutions will be available in one language, sometimes in both.

1. (yield curve) Use the results from Exercise 3 in Week 37

   (a) Plot the yield curve. Does something look odd? If so, what?
   (b) Calculate the Nelson-Siegel coefficients and fitted interest rates
   (c) Plot the the Nelson-Siegel fitted yield curve in the same plot as before and compare

   Note: You may have to remove one of the bonds from your data before computing the Nelson-Siegel coefficients. In R, the following functions are useful: "YieldCurve" package (explore the documentation yourself), Nelson.Siegel() – for computing Nelson-Siegel coefficients (look at examples and pay attention to how data is formatted for input into function), NSrates() – for computing the interest rates by Nelson-Siegel's model. In Matlab, you might consider the functions (needs to be downloaded from the file exchange) nelsonfit.m etc.

2. (duration, convexity) Use the results from Exercise 3 in Week 37

   (a) Compute the Macaulay duration and the modified duration for all bonds
   (b) Compute the convexity for all bonds
   (c) Compute Fisher-Weil durations and convexities using the obtained term structure model from Question 1