Homework 4, FRE-6971, due 5/6/2018, 6pm

Problem 1 (20 ponts):

Read Diebold & Li paper on Dynamic Nelson-Siegel model (DNS).

Dataset: CMT rates, sample: 2012-2015

Carry out estimation of DNS parameters in the following way:

1. Step 1: Assume a value of λ, and fit $\beta_1(t), \beta_2(t), \beta_3(t)$ to a set of yields observed on day t (repeat for all days in the dataset)

2. Step 2: Find λ that bests fits the whole dataset (Step1 needs to be repeated on each iteration, as you search for optimal λ). You can use an optimization package, or write your own code

Problem 2 (30 ponts):

Use results of DNS estimation you carried out in Problem 1.

Estimated model: DNS (optimal λ+time series of $\beta_1(t), \beta_2(t), \beta_3(t)$)

Perform the following analysis of results:

1. Step 1: Compute RMSE for each day in the sample and pick 5 days with largest RMSE

2. Step 2: Use 6m of data prior to each of the 5 days to fit AR(1) to each of $\beta_1(t), \beta_2(t), \beta_3(t)$ time series and co mpute half-lives (HL). Generate t+5d. t+10d, t+1m forecast for each of the 5 days, using the corresponding model for each forecast. Total of 3 forecasts for each of the 5 days.

3. Step 3. Do these forecasts perform better than those generated under a random walk assumption?

Problem 3 (20 points):

Fit PCA model to CMT returns using the same sample 2012-2015. Compare the in-sample explanatory power of first 3PCAs vs $\beta_1(t), \beta_2(t), \beta_3(t)$ of the DNS model. Be creative