smfprob3(13a).tex

SMF PROBLEMS 3. 1.11.2013

The purpose of this handout is to perform a Principal Components Analysis (PCA) on the US treasury rates between Jan. 2 2003 and Apr. 11 2013.

- 1. Loading the data: Use the function *read.csv* to load the data contained in it and the command *data.frame* to convert it to numerical values
- 2. Treating the missing values: Replace the missing values (i.e. equal to "NA") e.g. by replacing them by the average between of previous and next value. *Hint: For all the maturities, the missing values happen to be on the same days*
- 3. Taking the centred returns: Create the matrix of the centred returns (i.e. the first order difference of the series minus its mean) and, using the *pairs* function, inspect for correlation between the different variables.
- 4. **PCA:** Use the *princomp* function to run a PCA on the data. (*Hint: the* summary function gives the components weights, the loadings functions gives the components...) and comment on what components to retain.
- 5. Conclusion: Interpret the meaning of the significant components.

NHB/PMBF