

# 2015 MFE Programming Workshop Lab 2

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Getting started on this lab is likely to be a bit harder than the previous lab. It will require you to do some reading of R package manuals/vignettes. As you become more experienced with R programming, this will be commonplace, so it is best to become comfortable with it now. Having the skill of learning about a new package from its standard documentation will be immensely useful. R is so useful for data analytics because of the thousands of packages built for it. Learn to use them and you will quickly understand why R is such a fantastic data analytics platform.

## 1 Interpolating the Yield Curve

Date on the treasury yield curve can be found at:

<http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yield>

- Download the data for the latest day and import it into R (the last row on that page). Notice that the yields are for unequally spaced intervals (1mo, 3mo, 1 year, etc.)
- Using the `lubridate` and `xts` packages construct (you can use `as.xts()` or `xts()`) an `xts` object with has the the yields and observations. For example on November 3, 2014 you would have (again, notice the unequal spacing of dates):

Date	Yield
December 3, 2014	0.03
February 3, 2015	0.04
May 3, 2015	0.07
...	...

- Make a plot of this yield curve
- Now we are going to interpolate the missing yields (ie 2 months, 4 months, 5 months, etc.) all the way out to 30 years (360 months). Create an empty `xts` object that has the monthly date index starting at the first monthly observation going out to 30 years. The yields column will have `NA` values to begin, but you will want to populate the rows that you have observations for with the data from the treasury website.
- Now create two more columns in your dataset using `na.approx()` and `na.spline()` from the `xts` package. These functions will replace the `NA` values with interpolated values.
- Plot your interpolated yield curves