Interest Rate Models

Programming Project #1

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The purpose of this project is to build the LIBOR / OIS multicurve based on market data (please see the enclosed Excel spreadsheet DataSheetCurve.xls), and use it for pricing swaps. For simplicity, ignore the subtleties of the business day conventions, i.e. assume that the quarterly day count fractions are exactly 0.25, while the semiannual day count fractions are exactly 0.5. Don't delete your files, you will need them later!

You can use a curve fitting methodology and programming environment of your choice. However, I recommend using the interpolation library in Python's package scipy.

Problems

1. Build a function that computes the discount factor between any two dates.
2. Build a function that computes the forward LIBOR rate for any settlement and underlying tenor.
3. Build a function that computes the (spot or forward) swap rate for any settlement and underlying tenor.
4. Use the enclosed market data sheet to build the instantaneous OIS and LIBOR curves. In order to calibrate the model use one of scipy's optimization routines. Plot the resulting curves.
5. Build a function that calculates the PV of any spot or forward starting swap based on your multicurve.

This assignment is due on February 27.