Linear Interpolation

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1 Introduction

Linear interpolation means interpolation between two (or more) points by a straight line: it draws a straight line between two points (x_1, y_1) and (x_2, y_2). It is usually used for the approximation of a function where we have $(x_1, f(x_1))$ and $(x_2, f(x_2))$, but not $f(x)$.

2 Mathematical framework

$$y = y_1 + \frac{y_2 - y_1}{x_2 - x_1}(x - x_1); \tag{1}$$

where:

- (x_1, y_1) = the first known point;
- (x_2, y_2) = the second known point;
- x = the point at witch you want to estimate y;
- y = the estimate value of $f(x)$.

3 Model Yield Curve

We put $Maturity = x$ and $Yield = y$.

maturity (m)	Annualized yield
1 month	4.0%
2 month	4.1%
...	...
30 year	10%

Starting form the previous table we can calculate the yield corresponding to the maturity 1.5 month as follows,

$$y_{1.5month} = y_{1month} + \frac{y_{2month} - y_{1month}}{x_{2month} - x_{1month}}(x - x_{1month}) =$$
$$= 0.04 + \frac{0.041 - 0.04}{2/12 - 1/12}(1.5/12 - 1/12);$$