

NSCOEF2

Updated: 31 Mar 2016

Use [NSCOEF2](#) to calculate the Nelson Siegel coefficients for a zero coupon curve. Nelson and Siegel suggested calculating the yield curve at a point using this formula:

$$y_{\tau} = \beta_0 + \beta_1 \left[\frac{1 - \exp(-\tau/\lambda)}{\tau/\lambda} \right] + \beta_2 \left[\frac{1 - \exp(-\tau/\lambda)}{\tau/\lambda} - \exp(-\tau/\lambda) \right]$$

To find the coefficients, the program uses ordinary least squares to calculate the values of B_0 , B_1 , and B_2 for any value of λ and simply finds the value of λ which has the smallest residual sum of squares in the constraints defined by the input parameters.

Syntax

```
Public Shared Function NSCOEF2(  
    ByVal YieldCurve_RangeQuery As String,  
    ByVal NumSteps As Integer,  
    ByVal Tau_min As Double,  
    ByVal Tau_max As Double,  
    ByVal B0_min As Double,  
    ByVal B0_max As Double,  
    ByVal B1_min As Double,  
    ByVal B1_max As Double,  
    ByVal B2_min As Double,  
    ByVal B2_max As Double,)
```

Arguments

YieldCurve_RangeQuery

a T-SQL statement, as a string, that specifies the maturities (as measured in years) and their zero coupon rates to be used as in calculating the Nelson Siegel coefficients. *YieldCurve_RangeQuery* is an expression that returns a **String**, or of a type that can be implicitly converted to **{paramtype}**.

NumSteps

an integer value that identifies the number of calculations to be done between *Tau_min* and *Tau_max*. *NumSteps* is an expression that returns a **Integer**, or of a type that can be implicitly converted to **Integer**.

Tau_min

the lower end of the range of permissible values for tau. *Tau_min* is an expression that returns a **Double**, or of a type that can be implicitly converted to **Double**.

Tau_max

the upper end of the range of permissible values for tau. *Tau_max* is an expression that returns a **Double**, or of a type that can be implicitly converted to **Double**.

B0_min

the lower end of the range of permissible values for B_0 . *B0_min* is an expression that returns a **Double**, or of a type that can be implicitly converted to **Double**.

B0_max

the upper end of the range of permissible values for B_0 . *B0_max* is an expression that returns a **Double**, or of a type that can be implicitly converted to **Double**.

B1_min

the lower end of the range of permissible values for B_1 . *B1_min* is an expression that returns a **Double**, or of a type that can be implicitly converted to **Double**.

B1_max

the upper end of the range of permissible values for B_1 . *B1_max* is an expression that returns a **Double**, or of a type that can be implicitly converted to **Double**.

B2_min

the lower end of the range of permissible values for B_2 . *B2_min* is an expression that returns a **Double**, or of a type that can be implicitly converted to **Double**.

B2_max

the upper end of the range of permissible values for B_2 . *B2_max* is an expression that returns a **Double**, or of a type that can be implicitly converted to **Double**.

Return Type

`FinancialTypes.NSCOE2_table`

```
Class NSCOEF2_table
```

```
  Inherits Data.DataTable
```

```
  Property Item(RowIndex As Integer) As FinancialTypes.OutputRow_NSCOE2
```

```
Class OutputRow_NSCOE2
```

```
  Public B0 As Double
```

```
  Public B1 As Double
```

```
  Public B2 As Double
```

```
  Public Tau As Double
```

```
  Public RMSE As Double
```

```
End Class
```

Column	Description
B0	The first coefficient
B1	The second coefficient
B2	The third coefficient
Tau	Tau
RMSE	The residual sum of squares. $SQUARE(\text{SUM}(y - \hat{y}))$

Remarks

- The function is insensitive to order; it does not matter what order the dates and rates are passed in.
- See [NELSONSIEGEL](#) to calculate the interpolated values using the Nelson Siegel coefficients.
- See [NSCOEF](#) for another way to calculate the Nelson Siegel coefficients.
- If *NumSteps* is NULL, *NumSteps* = 50.
- If *Tau_min* is NULL, *Tau_min* = 0.5
- If *Tau_max* is NULL, *Tau_max* = 9.5
- If *B0_min* is NULL, *B0_min* = -1
- If *B0_max* is NULL, *B0_max* = 1
- If *B1_min* is NULL, *B1_min* = -1
- If *B1_max* is NULL, *B1_max* = 1
- If *B2_min* is NULL, *B2_min* = -1
- If *B2_max* is NULL, *B2_max* = 1

See Also

- [NELSONSIEGEL](#) - Zero coupon rate using Nelson Siegel formula
- [NSCOEF](#) - Nelson Siegel coefficients for a zero coupon curve