

# DURATION

Updated: 31 Mar 2016

Use the scalar valued function `DURATION` to calculate the annual duration of a security with regular, periodic interest payments. `DURATION` assumes a redemption value of 100. The formula for `DURATION` is:

$$D = \frac{\sum_{i=1}^N CF_i \times t_i \times DF^{t_i}}{\sum_{i=1}^N CF_i \times DF^{t_i}}$$

Where

- D = Duration
- CF<sub>i</sub> = i<sup>th</sup> future cash flow
- t<sub>i</sub> = time, in years, to the i<sup>th</sup> cash flow
- DF = (1 + Yld/Frequency)
- N = Number of coupon payments from settlement to maturity

## Syntax

```
Public Shared Function DURATION(  
    ByVal Settlement As Date,  
    ByVal Maturity As Date,  
    ByVal Rate As Double,  
    ByVal Yld As Double,  
    ByVal Frequency As Double,  
    ByVal Basis As String,)
```

## Arguments

### *Settlement*

the settlement date of the security. *Settlement* is an expression that returns a **Date**, or of a type that can be implicitly converted to **Date**.

### *Maturity*

the maturity date of the security. *Maturity* is an expression that returns a **Date**, or of a type that can be implicitly converted to **Date**.

### *Rate*

the security's annual coupon rate. *Rate* is an expression that returns a **Double**, or of a type that can be implicitly converted to **Double**.

### *Yld*

the security's annual yield. *Yld* is an expression that returns a **Double**, or of a type that can be implicitly converted to **Double**.

### *Frequency*

the number of coupon payments per year. For annual payments, *Frequency* = 1; for semi-annual, *Frequency* = 2; for quarterly, *Frequency* = 4; for bi-monthly *Frequency* = 6; for monthly *Frequency* = 12. *Frequency* is an expression that returns a **Double**, or of a type that can be implicitly converted to **Double**.

### Basis

the daycount convention.

Basis	Day count basis
0, "BOND"	US (NASD) 30/360
1, "ACTUAL"	Actual/Actual
2, "A360"	Actual/360
3, "A365"	Actual/365
4, "30E/360 (ISDA)", "30E/360", "ISDA", "30E/360 ISDA", "EBOND"	European 30/360
5, "30/360", "30/360 ISDA", "GERMAN"	30/360 ISDA
6, "NL/ACT"	No Leap Year/ACT
7, "NL/365"	No Leap Year /365
8, "NL/360"	No Leap Year /360
9, "A/365"	Actual/364
10, "BOND NON-EOM"	US (NASD) 30/360 non-end-of-month
11, "ACTUAL NON-EOM"	Actual/Actual non-end-of-month
12, "A360 NON-EOM"	Actual/360 non-end-of-month
13, "A365 NON-EOM"	Actual/365 non-end-of-month
14, "30E/360 NON-EOM", "30E/360 ICMA NON-EOM", "EBOND NON-EOM"	European 30/360 non-end-of-month
15, "30/360 NON-EOM", "30/360 ISDA NON-EOM", "GERMAN NON-EOM"	30/360 ISDA non-end-of-month
16, "NL/ACT NON-EOM"	No Leap Year/ACT non-end-of-month
17, "NL/365 NON-EOM"	No Leap Year/365 non-end-of-month
18, "NL/360 NON-EOM"	No Leap Year/360 non-end-of-month
19, "A/365 NON-EOM"	Actual/364 non-end-of-month

*Basis* is an expression that returns a **String**, or of a type that can be implicitly converted to **String**.

### Return Type

Double

## Remarks

- If the *Frequency* is invalid an error is returned.
- If the *Basis* is invalid an error is returned.

## See Also

- CFCONVEXITY - Convexity of a series of cash flows
- CFDURATION - Duration of a series of cash flows
- CFMDURATION - Modified duration of a series of cash flows
- CONVEXITY - Convexity of an option free bond
- MDURATION - Macauley Duration
- OFCCONVEXITY - Convexity of a bond with an odd first coupon
- OFCDURATION - Duration of a bond with an odd first coupon
- OFCMDURATION - Modified duration of a bond with an odd first coupon
- OFLCONVEXITY - Convexity of a bond with an odd first and odd last coupon
- OFLDURATION - Duration of a bond with an odd first and odd last coupon
- OFLMDURATION - Modified duration of a bond with an odd first and odd last coupon
- OLCCONVEXITY - Convexity of a bond with an odd last coupon
- OLCDURATION - Duration of a bond with an odd last coupon
- OLCMDURATION - Modified duration of a bond with an odd last coupon
- RPICONVEXITY - Convexity of a bond paying regular periodic interest
- RPIDURATION - Duration of a bond paying regular periodic interest
- RPIMDURATION - Modified duration of a bond paying regular periodic interest
- STEPCONVEXITY - Convexity of a stepped-coupon bond
- STEPDURATION - Duration of a stepped-coupon bond
- STEPMDURATION - Modified duration of a stepped-coupon bond