# STIR Pricing & Sensitivities

## Notation

|  |  |
| --- | --- |
|  | Future theoretical price |
|  | Adjusted start date of the future contract |
|  | Adjusted end date of the future contract |
|  | Value date as per Index Conventions from adjusted start date |
|  | Maturity date as per Index Conventions from value date |
|  | The period between adjusted start and end date as per day count fraction of the Future |
|  | The period between value date and maturity date as per day count fraction of the Index |
|  | Discount factor on value date as per the Zero Curve |
|  | Discount factor on maturity date as per the Zero Curve |
|  | Zero rate at value date |
|  | Zero rate at maturity date |
|  | Forward rate from time t1 to t2 as of the reference date |
|  | Time from reference date on the Zero Curve |
|  | Value date relative to reference date |
|  | Maturity date relative to reference date |
|  |  |

## Basics

The Discount factor is related to Zero Rate as follows:

|  |  |
| --- | --- |
|  | (1) |

The Forward rate is related to discount factors as follows:

|  |  |
| --- | --- |
|  | (2) |

The theoretical price of the STIR Future is:

|  |  |
| --- | --- |
|  | (3) |
|  | (4) |
|  | (5) |

## Delta

The Future’s theoretical price has sensitivity to zero rates at value date and maturity date due to the pricing formula (5). The first order sensitivities are given by:

|  |  |
| --- | --- |
|  | (6) |
|  | (7) |

Each of the delta must be apportioned to the Zero Curve pillar points.

## Gamma