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adjust_disc  

Adjusts the discount factors by a spread

Description

Adjusts the discount factors by a spread

Usage

adjust_disc(fd, spread)

Arguments

- **fd**: vector of discount factors used to discount cashflows in 1:length(fd) periods
- **spread**: effective spread

Examples

adjust_disc(fd = c(0.99, 0.98), spread = 0.01)

---

cashflow  

Get the cashflow for a loan

Description

Returns the cashflow for the loan, excluding the initial inflow for the loan taker

Usage

cashflow(l)

Arguments

- **l**: The loan
cft

Calculates the Total Financial Cost (CFT)

Description
This is the IRR of the loan’s cashflow, after adding all the extra costs

Usage
cft(amt, maturity, rate, up_fee = 0, per_fee = 0)

Arguments
amt The amount of the loan
maturity The maturity of the loan
rate The loan rate, in effective rate
up_fee The fee that the loan taker pays upfront
per_fee The fee that the loan payer pays every period

Details
It is assumed that the loan has monthly payments The CFT is returned as an effective rate of periodicity equal to that of the maturity and the rate The interest is calculated over amt + fee

Examples
cft(amt = 100, maturity = 10, rate = 0.05, up_fee = 1, per_fee = 0.1)

disc_cf

Value of a discounted cashflow

Description
Value of a discounted cashflow

Usage
disc_cf(fd, cf)
**Arguments**

- **fd**: The discount factor vector
- **cf**: The cashflow

**Examples**

disc_cf(fd = c(1, 0.99, 0.98, 0.97), cf = c(1, -0.3, -0.4, -0.6))

**Description**

Calculates the present value of a cashflow

**Usage**

disc_value(r, cf, d = 1:length(cf))

**Arguments**

- **r**: A rate curve
- **cf**: The vector of values corresponding to the cashflow
- **d**: The periods on which the cashflow occurs. If missing, it is assumed that cf[i] occurs on period i

**Value**

The present value of the cashflow

**Examples**

r <- rate_curve(rates = c(0.1, 0.2, 0.3), rate_type = "zero_eff")
disc_value(r, cf = c(-1, 1.10), d = c(0,1))
disc_value(r, cf = c(-1, 1.15*1.15), d = c(0,2))
**find_rate**

*Find the rate for a loan given the discount factors*

**Description**

Thru a root finding process, this function finds the rate that corresponds to a given set of discount factors, as for the loan to have the same present value discounted with the discount factors or with that constant rate.

**Usage**

```r
find_rate(m, d, loan_type, interval = c(1e-06, 2), tol = 1e-08)
```

**Arguments**

- **m**: The maturity of the loan
- **d**: The discount factor vector
- **loan_type**: One of the loan types
- **interval**: The interval for the root finding process
- **tol**: The tolerance for the root finding process

**Examples**

```r
find_rate(m = 3, d = c(0.99, 0.98, 0.97), loan_type = "bullet")
```

**irr**

*The IRR is returned as an effective rate with periodicity equal to that of the cashflow*

**Description**

Internal Rate of Return of a periodic cashflow (IRR)

**Usage**

```r
irr(cf, ts = seq(from = 0, by = 1, along.with = cf), interval = c(-1, 10), ...)
```

**Arguments**

- **cf**: The cashflow
- **ts**: The times on which the cashflow occurs. It is assumed that \( cf[\text{idx}] \) happens at moment \( ts[\text{idx}] \)
- **interval**: A length 2 vector that indicates the root finding algorithm where to search for the irr
- **...**: Other arguments to be passed on to uniroot
Examples

\[ \text{irr(cf = c(-1, 0.5, 0.9), ts = c(0, 1, 3))} \]

---

**loan**  
*Creates an instance of a loan class*

---

**Description**

Creates an instance of a loan class

**Usage**

\[ \text{loan(rate, maturity, amt, type, grace_int = 0, grace_amort = grace_int)} \]

**Arguments**

- **rate**: The periodic effective rate of the loan
- **maturity**: The maturity of the loan, measured in the same units as the periodicity of the rate
- **amt**: The amount loaned
- **type**: The type of loan. Available types are c("bullet", "french", "german")
- **grace_int**: The number of periods that the loan doesn't pay interest and capitalizes it. Leave in 0 for zero loans
- **grace_amort**: The number of periods that the loan doesn't amortize

**Examples**

\[ \text{loan(rate = 0.05, maturity = 10, amt = 100, type = "bullet")} \]

---

**npv**  
*Net Present Value of a periodic cashflow (NPV)*

---

**Description**

Net Present Value of a periodic cashflow (NPV)

**Usage**

\[ \text{npv(i, cf, ts = seq(from = 0, by = 1, along.with = cf))} \]
Arguments

- **i**: The rate used to discount the cashflow. It must be effective and with a periodicity that matches that of the cashflow.
- **cf**: The cashflow.
- **ts**: The times on which the cashflow occurs. It is assumed that \( cf[\text{idx}] \) happens at moment \( ts[\text{idx}] \). If empty, assumes that \( cf[\text{idx}] \) happens at period \( \text{idx} - 1 \).

Value

The net present value at

Examples

```r
npv(i = 0.01, cf = c(-1, 0.5, 0.9), ts = c(0, 1, 3))
```

---

## plot.rate_curve

Plots a rate curve

### Description

Plots a rate curve

### Usage

```r
## S3 method for class 'rate_curve'
plot(x, rate_type = NULL, y_labs_perc = TRUE, y_labs_acc = NULL, ...)
```

### Arguments

- **x**: The rate curve.
- **rate_type**: The rate types to plot, in c("french", "fut", "german", "zero_eff", "zero_nom", "swap", "zero_cont")
- **y_labs_perc**: If TRUE, the y axe is labeled with percentages.
- **y_labs_acc**: If y_labs_perc is TRUE, the accuracy for the percentages (i.e., 1 for xx%, 0.1 for xx.x%, 0.01 for xx.xx%, etc)
- **...**: Other arguments (unused)

### Examples

```r
r <- rate_curve(rates = c(0.1, 0.2, 0.3), rate_type = "zero_eff")
plot(r)
```

```r
## Not run:
plot(r, rate_type = "german")
plot(r, rate_type = c("french", "german"))
```

## End(Not run)
pmt

The value of the payment of a loan with constant payments (french type amortization)

Description
The value of the payment of a loan with constant payments (french type amortization)

Usage
pmt(amt, maturity, rate)

Arguments
amt The amount of the loan
maturity The maturity of the loan
rate The rate of the loan

Details
The periodicity of the maturity and the rate must match, and this will be the periodicity of the payments

Examples
pmt(amt = 100, maturity = 10, rate = 0.05)

rate
The rate of a loan with constant payments (french type amortization)

Description
The rate of a loan with constant payments (french type amortization)

Usage
rate(amt, maturity, pmt, extrema = c(1e-04, 1e+09), tol = 1e-04)

Arguments
amt The amount of the loan
maturity The maturity of the loan
pmt The payments of the loan
extrema Vector of length 2 that has the minimum and maximum value to search for the rate
tol The tolerance to use in the root finding algorithm
Details

The periodicity of the maturity and the payment must match, and this will be the periodicity of the rate (which is returned as an effective rate).

Examples

rate(amt = 100, maturity = 10, pmt = 15)

rate_curve

Creates a rate curve instance

Description

Creates a rate curve instance

Usage

rate_curve(
  rates = NULL,
  rate_type = "zero_eff",
  pers = 1:length(rates),
  rate_scale = 1,
  fun_d = NULL,
  fun_r = NULL,
  knots = seq.int(from = 1, to = max(pers), by = 1),
  functor = function(x, y) splinefun(x = x, y = y, method = "monoH.FC")
)

Arguments

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rates</td>
<td>A rate vector</td>
</tr>
<tr>
<td>rate_type</td>
<td>The rate type. Must be one of c(&quot;fut&quot;, &quot;zero_nom&quot;, &quot;zero_eff&quot;, &quot;swap&quot;, &quot;zero_cont&quot;)</td>
</tr>
<tr>
<td>pers</td>
<td>The periods the rates correspond to</td>
</tr>
<tr>
<td>rate_scale</td>
<td>In how many periods is the rate expressed. For example, when measuring periods in days, and using annual rates, you should use 365. When measuring periods in months, and using annual rates, you should use 12. If no scaling, use 1.</td>
</tr>
<tr>
<td>fun_d</td>
<td>A discount factor function. fun_d(x) returns the discount factor for time x, vectorized on x</td>
</tr>
<tr>
<td>fun_r</td>
<td>A rate function. fun_r(x) returns the EPR for time x, vectorized on x</td>
</tr>
<tr>
<td>knots</td>
<td>The nodes used to bootstrap the rates. This is a mandatory argument if a rate function or discount function is provided</td>
</tr>
<tr>
<td>functor</td>
<td>A function with parameters x and y, that returns a function used to interpolate</td>
</tr>
</tbody>
</table>
Note
Currently a rate curve can only be built from one of the following sources

1. A discount factor function
2. A rate function and a rate type from the following types: "fut", "zero_nom", "zero_eff", "swap" or "zero_cont"
3. A rate vector, a pers vector and a rate type as before

Examples
rate_curve(rates = c(0.1, 0.2, 0.3), rate_type = "zero_eff")
rate_curve(fun_r = function(x) rep_len(0.1, length(x)), rate_type = "swap", knots = 1:12)
rate_curve(fun_d = function(x) 1 / (1 + x), knots = 1:12)

rem
Remaining capital in a loan

Description
The amount that has to be repayed at each moment in a loan, at the end of the period

Usage
rem(cf, amt, r)

Arguments
  cf            The cashflow of the loan, not including the initial inflow for the loan taker
  amt           The original amount of the loan
  r             The periodic rate of the loan

Examples
rem(cf = rep_len(0.4, 4), amt = 1, r = 0.2)

tvm
Functions for managing cashflows and interest rate curves.
**xirr**

The IRR is returned as an effective annual rate

Description

Internal Rate of Return of an irregular cashflow (IRR)

Usage

```r
xirr(cf, d, tau = NULL, comp_freq = 1, interval = c(-1, 10), ...)
```

Arguments

- `cf` The cashflow
- `d` The dates when each cashflow occurs. Same length as the cashflow. Only used if `tau` is `NULL`. Assumes act/365 fractions
- `tau` The year fractions when each cashflow occurs. Same length as the cashflow
- `comp_freq` The compounding frequency used. Most relevant cases are 1 for yearly, 2 twice a year, 4 quarterly, 12 monthly, 0 no compounding, Inf continuous
- `interval` A length 2 vector that indicates the root finding algorithm where to search for the irr
- `...` Other arguments to be passed on to uniroot

Examples

```r
xirr(cf = c(-1, 1.5), d = Sys.Date() + c(0, 365))
```

---

**xnpv**

Net Present Value of an irregular cashflow (NPV)

Description

Net Present Value of an irregular cashflow (NPV)

Usage

```r
xnpv(i, cf, d, tau = NULL, comp_freq = 1)
```

Arguments

- `i` The rate used to discount the cashflow
- `cf` The cashflow
- `d` The dates when each cashflow occurs. Same length as the cashflow. Only used if `tau` is `NULL`. Assumes act/365 fractions
- `tau` The year fractions when each cashflow occurs. Same length as the cashflow
- `comp_freq` The compounding frequency used. Most relevant cases are 1 for yearly, 2 twice a year, 4 quarterly, 12 monthly, 0 no compounding, Inf continuous
Examples

xnpv(i = 0.01, cf = c(-1, 0.5, 0.9), d = as.Date(c("2015-01-01", "2015-02-15", "2015-04-10")))

Description

Returns a particular rate or rates from a curve

Usage

## S3 method for class 'rate_curve'
rate_curve[r[rate_type = "zero_eff", x = NULL]

Arguments

- **r**: The rate_curve object
- **rate_type**: The rate type
- **x**: The points in time to return

Value

If x is NULL, then returns a rate function of rate_type type. Else, it returns the rates of rate_type type and corresponding to time x

Examples

r <- rate_curve(rates = c(0.1, 0.2, 0.3), rate_type = "zero_eff")
r["zero_eff"]
r["swap",c(1.5, 2)]
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