Package 'ifm'

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`ifm-package` *Set of functions for financial evaluation of Software Projects*

Description

R packeage with a set of functions for financial evaluation of Software Project.

Details

The DESCRIPTION file: This package was not yet installed at build time.

Index: This package was not yet installed at build time.
~~ An overview of how to use the package, including the most important functions ~~

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References

~~ Literature or other references for background information ~~

See Also

~~ Optional links to other man pages, e.g. ~~

Examples

```
## examples here...
```

`cpm.all.schedule` *Generates all possible schedules for a cpm network*

Description

Generates all possible schedules for a cpm network

Usage

```
cpm.all.schedule(est, slack)
```

Arguments

`est`	early start time vector
`slack`	activities slack

Value

Matrix with all mininum makespan (the time to complete all jobs) cpm start time schedules

See Also

Other scheduling: `critical.path.method`, `mmf.all.sequences`, `mmf.npv`

Examples

```
#Use critical.path.method function to calculate a set of project
#activities:

ex.cpm.activities.duration <- c(1,4,5,7,2,3,1)
ex.cpm.activities.successors <- list(c(2,3), 4, c(4,5), 6, 7, 7, c(0))
ex.cpm <- critical.path.method(ex.cpm.activities.duration,
                               ex.cpm.activities.successors)

# Now, that we have the CPM vector with:
#  - est (Early Start Time) - ex.cpm[[1]]
#  - eft (Early Finish Time) - ex.cpm[[2]]
#  - lst (Late Start Time) - ex.cpm[[3]]
#  - lft (Late Finish Time) ex.cpm[[4]]

ex.cpm.activities.schedule <- cpm.all.schedule(ex.cpm[[1]],
                                               ex.cpm[[3]] - ex.cpm[[1]])

# note: ex.cpm[[3]] - ex.cpm[[1]] is the slack time (or 'float') for each task
```

`critical.path.method` *The critical path method (CPM) is a step-by-step project management technique for process planning that defines critical and non-critical tasks with the goal of preventing time-frame problems and process bottlenecks#' activities are "critical," meaning that they have to be done on time or else the whole project will take longer.*

Description

The Critical Path Method or Critical Path Analysis, is a mathematically based algorithm for scheduling a set of project activities.

CPM will get how long your complex project will take to complete and which activities are "critical," meaning that they have to be done on time or else the whole project will take longer.

Usage

```
critical.path.method(activities.duration, activities.successors)
```

Arguments

`activities.duration`
: Vector with activities duration.

`activities.successors`
: Vector with dependencies between activities.

Value

The optimized sequence of activities that must be performed to guarantee the shorthest duration.

See Also

Other scheduling: `cpm.all.schedule`, `mmf.all.sequences`, `mmf.npv`

Examples

```
ex.cpm.activities.duration <- c(1,4,5,7,2,3,1)
ex.cpm.activities.successors <- list(c(2,3), 4, c(4,5), 6, 7, 7, c(0))
ex.cpm <- critical.path.method(ex.cpm.activities.duration,
                               ex.cpm.activities.successors)
```

---

discount.rate.vector *Vectorize the Discount Rate*

Description

Generate a vector with discount rate to be applied to each of the time periods.

Usage

```
discount.rate.vector(interest.rate, number.of.periods,
  begin.of.period = FALSE)
```

Arguments

`interest.rate`	A number that represents the nominal Interest Rate, presented by year.
`number.of.periods`	Times that interest rate should be applied.
`begin.of.period`	A boolean that represents if the Tax Rate will be applied at the begining of period. FALSE by default, represents that Tax Rate will be applied at second period .

See Also

Other financial: `draw.cfs`, `future.value`, `inflation.free.interest.rate`, `net.future.value`, `net.present.value`, `present.value`

Examples

```
ex.disc.vector <- discount.rate.vector(6.19, 12)
```

`draw.cfs` *Draw the graph of cash flow in order to facilitate the study and the effects of the analysis of a certain application.*

Description

Cash flow is a mathematical concept that can be plotted in order to facilitate the study and the effects of the analysis of a certain application, which may be an investment loan, finance, etc.

Usage

```
draw.cfs(cfs, gt = "Cash Flow Graphic", to.file = FALSE,
  filename = "output/draw.cfs.graph.png")
```

Arguments

`cfs`	A vector with a series of cash flows.
`gt`	A title for the graph.
`to.file`	Save or not the graph in the file
`filename`	File's name

Details

Normally a cash flow contains inputs and outputs of capital, marked in the timeline starting at t = 0.

A typical example is the graph that represents a bank loan held by a form of business that shall return this loan in n equal installments over the following months. E1 E2 E3 ... En-1 En ^ I 0 1 2 3 ... n-1 n I I I V V V S1 S2 S3 ... Sn-1 Sn

Is possible to note that the value is entered in the company's cash (cash was positive) and S1, S2, ..., Sn are the values of the parcels will leave the company's cash (negative).

The fact that each arrow is pointing upward (positive) or down (negative), it is assumed by convention, and the cash flow will depend on who receives or pays the Capital at a certain time, and:

t = 0 indicates the current day;

Ek is the capital input at a time k;

Sk is the capital output at a time k.

See Also

Other financial: `discount.rate.vector`, `future.value`, `inflation.free.interest.rate`, `net.future.value`, `net.present.value`, `present.value`

Examples

```
ex.cfs <- c(-2000,1000,1500,-500,500)
draw.cfs(ex.cfs,'My Cash Flow')
```

draw.discounted.cash *Draw Discounted Cash vs Time*

Description

Draw Discounted Cash vs Time

Usage

```
draw.discounted.cash(discounted.cash)
```

Arguments

`discounted.cash`
: A vector with discounted cash flow for each timestamp.

excel.xls.to.list *Extract a list of variables from the spreadsheet to be used on the maxNPV function.*

Description

This function is responsible for reading a spreadsheet representing the project, and return a list with the following information (in this order): The interest rate, the list of activities, the list of durations of activities, the list of predecessors of activities and the matrix that represents the cash flow series

Arguments

`xls.spreadsheet.path`
: The complete path to the spreadsheet that represents the project.

Value

List of variables to be used on the maxNPV function.

Examples

```
ex.sheet.data <- excel.xls.to.list("../resources/spreadsheet.xls")
```

future.value *Calculate the future value of an asset at a specific date.*

Description

It measures the nominal future sum of money that a given sum of money is "worth" at a specified time in the future assuming a certain interest rate, or more generally, rate of return.

Usage

```
future.value(present.value, interest.rate, number.of.periods)
```

Arguments

present.value	A number that represents the present value of the money.
interest.rate	A number that represents the interest rate.
number.of.periods	Times that interest rate should be applied.

Value

future value

See Also

Other financial: discount.rate.vector, draw.cfs, inflation.free.interest.rate, net.future.value, net.present.value, present.value

Examples

```
ex.fv <- future.value(1000, 1.1425, 12)
```

inflation.free.interest.rate *Calculate the Inflation-free Interest Rate.*

Description

Calculate the Inflation-free Interest Rate.

Usage

```
inflation.free.interest.rate(interest.rate = 14.25, inflation.rate = 7.59)
```

Arguments

interest.rate	A number that represents the nominal Interest Rate, presented by year.
inflation.rate	A number that represents the Inflation Rate, presented by year.

Value

Returns the inflation-free interest rate

See Also

Other financial: `discount.rate.vector`, `draw.cfs`, `future.value`, `net.future.value`, `net.present.value`, `present.value`

Examples

```
ex.ifir <- inflation.free.interest.rate(14.25, 12)
```

`mmf.all.sequences` *Generates the list of all possible MMF sequences (topsorts), constrained by the predecessors*

Description

Generates the list of all possible MMF sequences (topsorts), constrained by the predecessors

Usage

```
mmf.all.sequences(predecessors = 0)
```

Arguments

`predecessors`	List of Predecessors - Zero for none. The index of the list of predecessors represents the id of MMF and the value in that position the id of MMF's predecessors. For instance, in list(0,1,2,3,1,5,c(4,6)), we have for MMF 1, predecessor MMF 0; for MMF 2, predecessor MMF 7, predecessors 4 and 6

Value

List of all possible MMF sequences.

See Also

Other scheduling: `cpm.all.schedule`, `critical.path.method`, `mmf.npv`

Examples

```
ex.activities.predecessors<-list(0,1,2,3,1,5,c(4,6))
ex.mmf.seq <- mmf.all.sequences(ex.activities.predecessors)
```

mmf.df.1r — *Generates a data frame with Sequence, Schedule, NPV, Breakeven and Self Funding*

Description

Generates a data frame with Sequence, Schedule, NPV, Breakeven and Self Funding

Usage

```
mmf.df.1r(mmf.seq, mmf.sched, mmf.npv)
```

Arguments

mmf.seq	A list of sequences
mmf.sched	A list of schedules
mmf.nvp	A list of NPV values

mmf.max.npv — *Return Max NPV*

Description

Return Max NPV

Usage

```
mmf.max.npv(mmf.npv.sum, mmf.seq, mmf.sched)
```

mmf.npv — *Calculates NPV for all schedules*

Description

Calculates NPV for all schedules

Usage

```
mmf.npv(cfs, durations, all.sequences, interest.rate)
```

Arguments

cfs	A vector with a series of cash flows.
durations	A vector with a list of activities durations.
all.sequences	List of all possible MMF sequences.
interest.rate	A number that represents the nominal Interest Rate, presented by year.

Value

A list with all shedules, all npv csf and sum of each npv.

See Also

Other scheduling: `cpm.all.schedule`, `critical.path.method`, `mmf.all.sequences`

Examples

```
# Loading data from XLS
ex.sheet.data <- excel.xls.to.list("../resources/spreadsheet.xls")
ex.sheet.data.interest.rate <- ex.sheet.data[[1]]
ex.sheet.data.activities <- ex.sheet.data[[2]]
ex.sheet.data.durations <- ex.sheet.data[[3]]
ex.sheet.data.predecessors <- ex.sheet.data[[4]]
ex.sheet.data.cfs <- ex.sheet.data[[5]]

# Generating all possible implementation sequences
ex.mmf.seq <- mmf.all.sequences(ex.sheet.data.predecessors)

# Calculating NVP to all possible sequences
ex.mmf.npv <- mmf.max.npv(ex.sheet.data.cfs,
                          ex.sheet.data.durations,
                          ex.mmf.seq,
                          ex.sheet.data.interest.rate)

# Selecting sequence ID which max NPV
ex.mmf.npv.max <- which.max(ex.mmf.npv[[3]])

ex.mmf.sched <- ex.mmf.npv[[1]]
ex.mmf.npv <- ex.mmf.npv[[2]]
ex.mmf.npv.sum <- ex.mmf.npv[[3]]

# Index of sequence with max NPV
# ex.mmf.npv.max <- which.max(ex.mmf.npv.sum)

# Value of max NPV
ex.mmf.npv.max.value <- ex.mmf.npv.sum[[ex.mmf.npv.max]]

# Sequence with best NPV
ex.mmf.npv.max.sequence <- ex.mmf.seq[ex.mmf.npv.max]

# Schedule of sequence with best NPV
ex.mmf.npv.max.sched <- ex.mmf.sched[ex.mmf.npv.max]
```

`net.future.value` *Net Future Value is a combination of different future values from different times, all which are put into one larger present value.*

Description

Net Future Value is a combination of different future values from different times, all which are put into one larger present value.

Usage

```
net.future.value(cfs, interest.rate, begin.of.period = FALSE)
```

Arguments

cfs	A vector with a series of cash flows.
interest.rate	A number that represents the nominal Interest Rate, presented by year.
begin.of.period	A boolean that represents if the Tax Rate will be applied at the begining of period. FALSE by default.

Value

A vector with values updated to future value.

See Also

Other financial: discount.rate.vector, draw.cfs, future.value, inflation.free.interest.rate, net.present.value, present.value

Examples

```
ex.nfv <- net.future.value(c(-350,100,200,150,75), 6.19, TRUE)
```

---

net.present.value *difference between the present values of cash inflows and outflows*

Description

calculates the difference between the present values of cash inflows and outflows

Usage

```
net.present.value(cfs, interest.rate, begin.of.period = FALSE)
```

Arguments

cfs	A vector with a series of cash flows.
interest.rate	A number that represents the nominal Interest Rate, presented by year.
begin.of.period	A boolean that represents if the Tax Rate will be applied at the begining of period. FALSE by default, the Tax Rate will be applied to the second period

Value

The sum of cash flows incomes/outcomes applying the Tax Rate to the present time

See Also

Other financial: discount.rate.vector, draw.cfs, future.value, inflation.free.interest.rate, net.future.value, present.value

Examples

```
ex.npv <- net.present.value(c(-350,100,200,150,75), 6.19, TRUE)
```

`present.value` *Calculate the present value of an asset at a specific date.*

Description

In economics, present value, also known as present discounted value, is the value of an expected income stream determined as of the date of valuation. The present value is always less than or equal to the future value because money has interest-earning potential, a characteristic referred to as the time value of money, except during times of negative interest rates, when the present value will be less than the future value.

Usage

```
present.value(future.value, interest.rate, number.of.periods)
```

Arguments

`future.value`	A number that represents the future value of the money.
`interest.rate`	A number that represents the interest rate.
`number.of.periods`	A number that represent the number of periods.

See Also

Other financial: discount.rate.vector, draw.cfs, future.value, inflation.free.interest.rate, net.future.value, net.present.value

Examples

```
ex.pv <- present.value(1000, 1.1425, 12)
```

schedules.1r *Generates all schedules for ONE resource, Denne Method.*

Description

Generates all schedules for ONE resource, Denne Method.

Usage

```
schedules.1r(sequences, durations)
```

Arguments

sequences	All sequences
durations	Duration of activities

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