Package: EngrEcon (via r-universe)

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Title Engineering Economics Analysis for Engineering Projects Cost Analysis

Version 1.0.0

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Description Computing economic analysis in civil infrastructure and ecosystem restoration projects is a typical activity. This package contains Standard cost engineering and engineering economics methods that are applied to convert between present, future, and annualized costs. Newnan D. (2020) <ISBN 9780190931919> "Engineering Economic Analysis".

URL GitHub (<https://github.com/USACE-WRISES>)

Encoding UTF-8

RoxygenNote 7.3.1

Depends R (>= 4.1.0)

NeedsCompilation no

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Repository https://liyabera.r-universe.dev

RemoteUrl https://github.com/cran/EngrEcon

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RemoteSha 95c52e626bdd21cd271aa8955c941ad2f452fd7f

Contents

`annual_to_future` *Calculate future value from a uniform annual payment* `annual_to_future` *Compute future values from uniform annual payments using uniform series compound amount factor (uscaf)*

Description

Calculate future value from a uniform annual payment

`annual_to_future` Compute future values from uniform annual payments using uniform series compound amount factor (uscaf)

Usage

```
annual_to_future(i, n, A)
```

Arguments

`i`	discount rate in percent per year
`n`	life span in years
`A`	series of uniform annual payments

Value

FV

References

Newnan, D. G., Eschenbach, T. G., Lavelle, J. P., & Oxford, N. Y. Engineering Economic Analysis, 14th ed. New York, Oxford University Press, 2020

David, W., & Terry, R. Fundamentals of Engineering Economics and Decision Analysis. Springer Nature, 2012

Examples

```
# Result: FV = 5664161
annual_to_future(0.08, 30, 50000)
```

annual_to_present — *Calculate present value from a uniform annual payment* `annual_to_present` *Compute present value from uniform annual payments using uniform series present worth factor (uswf)*

Description

Calculate present value from a uniform annual payment

`annual_to_present` Compute present value from uniform annual payments using uniform series present worth factor (uswf)

Usage

```
annual_to_present(i, n, A)
```

Arguments

`i`	discount rate in percent per year
`n`	life span in years
`A`	series of uniform annual payments

Value

pr.value

References

Newnan, D. G., Eschenbach, T. G., Lavelle, J. P., & Oxford, N. Y. Engineering Economic Analysis, 14th ed. New York, Oxford University Press, 2020

David, W., & Terry, R. Fundamentals of Engineering Economics and Decision Analysis. Springer Nature, 2012

Examples

```
# Result: pr.value = $337733.5
annual_to_present(0.08, 30, 30000)
```

cashflow — *Calculate present value and annual value from a given future payments of cash flows* `cashflow` *Compute a given cash flow data's present value and annual value. The first column is the cash flow year;the rest is the cash flow money. The number of rows is the lifespan*

Description

Calculate present value and annual value from a given future payments of cash flows

`cashflow` Compute a given cash flow data's present value and annual value. The first column is the cash flow year;the rest is the cash flow money. The number of rows is the lifespan

Usage

```
cashflow(i, cashflowdata)
```

Arguments

`i`	annual interest rate in percentage
`cashflowdata`	cash flow data containing the life span and money value of the cash flow for each year

Value

cash.flow.table

Examples

```
# Result : cash.flow.table
# Result : future value = 232540.78
# Result : present value = 206330.96
year = c(1:5)
capital = c(63000,1300,1300,1600,1300)
year1 = c(60000,0,10000,0,0)
year2 = c(0,0,30000,50000,0)
cashflowdata <- data.frame (year, capital, year1, year2)
cashflow(0.055, cashflowdata)
```

`effective_i` *Calculate effective annual interest rate for a known nominal rate and compounding period per year* `effective_i` *Compute future value nominal rate and compounding period per year, and frequency.*

Description

Calculate effective annual interest rate for a known nominal rate and compounding period per year

`effective_i` Compute future value nominal rate and compounding period per year, and frequency.

Usage

```
effective_i(r, m = c("yearly", "quarterly", "monthly"))
```

Arguments

`r`	nominal interest rate in decimal number
`m`	number of compounding period per year monthly = 12 Quarterly = 4 yearly = 1

Value

effective_i

References

Newnan, D. G., Eschenbach, T. G., Lavelle, J. P., & Oxford, N. Y. (2020). Engineering Economic Analysis (14th ed.). New York, Oxford University Press.

David, W., & Terry, R. (2012). Fundamentals of Engineering Economics and Decision Analysis. Springer Nature.

Examples

```
# Result: effective_i =
effective_i (0.08, m = "yearly")
```

future_to_annual	*Compute annual payment value from future value* `future_to_annual` *calculate annual value from future value using the accumulated amount after years using sinking fund factor (sff)*

Description

Compute annual payment value from future value

`future_to_annual` calculate annual value from future value using the accumulated amount after years using sinking fund factor (sff)

Usage

```
future_to_annual(i, n, FV)
```

Arguments

`i`	discount rate in percent per year
`n`	life span in years
`FV`	accumulated (future) value

Value

A

References

Newnan, D. G., Eschenbach, T. G., Lavelle, J. P., & Oxford, N. Y. Engineering Economic Analysis, 14th ed. New York, Oxford University Press, 2020

David, W., & Terry, R. Fundamentals of Engineering Economics and Decision Analysis. Springer Nature, 2012

Examples

```
# Result: A = 5737.83
future_to_annual(0.08, 30, 650000)
```

`future_to_present` *Compute present values from future payments (or cash flow)* `future_to_present` *calculate present value from future value using present worth factor (pwf)*

Description

Compute present values from future payments (or cash flow)

`future_to_present` calculate present value from future value using present worth factor (pwf)

Usage

```
future_to_present(i, n, FV)
```

Arguments

`i`	discount rate in percent per year
`n`	life span in years
`FV`	future value

Value

pr.value

References

Newnan, D. G., Eschenbach, T. G., Lavelle, J. P., & Oxford, N. Y. Engineering Economic Analysis, 14th ed. New York, Oxford University Press, 2020

David, W., & Terry, R. Fundamentals of Engineering Economics and Decision Analysis. Springer Nature, 2012

Examples

```
# Result: pr.value = 2981.32
future_to_present(0.08, 30, 30000)
```

`gradient_to_annual` *Calculate annual value from uniform gradient payment* `gradient_to_annual` *Compute annual value from uniform gradient payments using uniform gra present worth factor (ugaw)*

Description

Calculate annual value from uniform gradient payment

`gradient_to_annual` Compute annual value from uniform gradient payments using uniform gra present worth factor (ugaw)

Usage

```
gradient_to_annual(i, n, G, A)
```

Arguments

`i`	discount rate in percent per year
`n`	life span in years
`G`	uniform gradient payments
`A`	initial annual payment

Value

ann.value

References

Newnan, D. G., Eschenbach, T. G., Lavelle, J. P., & Oxford, N. Y. Engineering Economic Analysis, 14th ed. New York, Oxford University Press, 2020

David, W., & Terry, R. Fundamentals of Engineering Economics and Decision Analysis. Springer Nature, 2012

Examples

```
# Result: ann.value = $ 105138.30
gradient_to_annual(0.08, 30, 6000, 50000)
```

`gradient_to_future` *Calculate future value from uniform gradient payment* `gradient_to_future` *Compute future value from uniform gradient payments using uniform gradient present worth factor (ugfw)*

Description

Calculate future value from uniform gradient payment

`gradient_to_future` Compute future value from uniform gradient payments using uniform gradient present worth factor (ugfw)

Usage

```
gradient_to_future(i, n, G)
```

Arguments

`i`	discount rate in percent per year
`n`	life span in years
`G`	uniform gradient payments

Value

fr.value

References

Newnan, D. G., Eschenbach, T. G., Lavelle, J. P., & Oxford, N. Y. Engineering Economic Analysis, 14th ed. New York, Oxford University Press, 2020

David, W., & Terry, R. Fundamentals of Engineering Economics and Decision Analysis. Springer Nature, 2012

Examples

```
# Result: fr.value = $ 312312
gradient_to_future(0.08, 30,300)
```

`gradient_to_present` *Calculate present value from uniform gradient payment* `gradient_to_present` *Compute present value from uniform gradient payments using uniform gradient present worth factor (ugpw)*

Description

Calculate present value from uniform gradient payment

`gradient_to_present` Compute present value from uniform gradient payments using uniform gradient present worth factor (ugpw)

Usage

```
gradient_to_present(i, n, G)
```

Arguments

`i`	discount rate in percent per year
`n`	life span in years
`G`	uniform gradient payments

Value

pr.value

References

#' Newnan, D. G., Eschenbach, T. G., Lavelle, J. P., & Oxford, N. Y. Engineering Economic Analysis, 14th ed. New York, Oxford University Press, 2020

David, W., & Terry, R. Fundamentals of Engineering Economics and Decision Analysis. Springer Nature, 2012

Examples

```
# Result: pr.value = 310367.40
gradient_to_present(0.08, 30, 3000)
```

`interest_during_construction` *Compute interest during construction* `interest_during_construction` *calculate interest during construction using a monthly discount factor*

Description

Compute interest during construction

`interest_during_construction` calculate interest during construction using a monthly discount factor

Usage

```
interest_during_construction(i, duration, capital)
```

Arguments

`i`	interest rate in percent per year
`duration`	construction duration in months
`capital`	first/capital cost

Value

idc

References

Engineer, U. S. A., & Resources, W. National Economic Development (NED) Procedures Manual-National Development Costs. U.S. Army Corps of Engineers Humphreys Engineer Center Support Activity Institute for Water Resources, DACWC72-90(June)1993.

Examples

```
# Result: idc ($) = 18992.14
interest_during_construction (0.027, 25, 700000)
```

`om_distribute` *Calculate the present value of periodic operations and maintenance costs* `om_distribute` *Distribute periodic present value operations and maintenance costs over a project life span, discount over project, and compute present value*

Description

Calculate the present value of periodic operations and maintenance costs

`om_distribute` Distribute periodic present value operations and maintenance costs over a project life span, discount over project, and compute present value

Usage

```
om_distribute(i, n, fq, OM)
```

Arguments

`i`	discount rate in percent per year
`n`	life span in years
`fq`	frequency of cost in years
`OM`	operation and maintenance cost incurred at each interval in present value

Value

OM_dist

References

Add citation as needed.

Examples

```
#Result is the present value cost of periodic operations and maintenance expenses.
# Result: idc ($) = 8174.547
om_distribute(0.03, 50, 3, 1000)
```

present_to_annual	*Compute annual payment from present value* present_to_annual *Compute uniform series annual payments from present value using capital recovery factor (crf)*

Description

Compute annual payment from present value

present_to_annual Compute uniform series annual payments from present value using capital recovery factor (crf)

Usage

```
present_to_annual(i, n, PV)
```

Arguments

i	discount rate in percent per year
n	life span in years
PV	present value

Value

ann.value

References

Newnan, D. G., Eschenbach, T. G., Lavelle, J. P., & Oxford, N. Y. Engineering Economic Analysis, 14th ed. New York, Oxford University Press, 2020

David, W., & Terry, R. Fundamentals of Engineering Economics and Decision Analysis. Springer Nature, 2012

Examples

```
# Result: ann.value = $17765.49
present_to_annual(0.08, 30, 200000)
```

present_to_future — *Compute future values from present value*

Description

`present_to_future` calculate future value from present value using compound amount factor (caf)

Usage

```
present_to_future(i, n, PV)
```

Arguments

`i`	discount rate in percent per year
`n`	life span in years
`PV`	present value

Value

fr.value

References

Newnan, D. G., Eschenbach, T. G., Lavelle, J. P., & Oxford, N. Y. Engineering Economic Analysis, 14th ed. New York, Oxford University Press, 2020

David, W., & Terry, R. Fundamentals of Engineering Economics and Decision Analysis. Springer Nature, 2012

Examples

```
# Result: fr.value = 9056391

present_to_future (0.08, 30, 900000)
```

Index