Package 'inventorize'

May 19, 2019

Title Inventory Analytics and Cost Calculations

Version 1.0.2

Description Facilitate inventory analysis calculations,pricing and promotions calculations.
the package includes calculations of inventory metrics, profit calculations and ABC analysis calculations.
This version has only normal and Poisson distributions but I am hoping that other distributions will follow in later versions.
The functions are referenced from :
1-Harris, Ford W. (1913). ``How many parts to make at once". Factory, The Magazine of Management. <isbn10: 135–136, 152>.
2- Nahmias, S. Production and Operations Analysis. McGraw-
Hill International Edition. <isbn: 0-07- 2231265-3. Chapter 4>.
3-Silver, E.A., Pyke, D.F., Peterson, R. Inventory Management and Production Planning and Scheduling. <isbn: 978-0471119470>.
4-Ballou, R.H. Business Logistics Management. <isbn: 978-0130661845>. Chapter 9.
5-MIT Micromasters Program.
For further details or correspondence :<https://www.linkedin.com/in/haythamomar/>, <www.rescaleanalytics.com>.

Depends R (>= 3.4.0)

License GPL-3

RoxygenNote 6.1.1

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Imports dplyr, ggplot2, stats, magrittr, plyr,

Suggests knitr, rmarkdown

NeedsCompilation no

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R topics documented:

ABC *ABC*

Description

Identyfing ABC category based on the pareto rule. Identyfing ABC category based on the pareto rule.A category is up to 80

Usage

```
ABC(data, na.rm = TRUE)
```

Arguments

data,	Data frame of tuo columns,first column is the item name, second column is the item value/flow/demand.
na.rm,	logical and by default is TRUE

Value

a dataframe that contains ABC categories with a bar plot of the count of items in each category.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
ABC(data.frame(SKU= seq(1:1000),demand=runif(1000,1,1000)))
```

CriticalRatio *Criticalratio*

Description

Calculating critical ratio of a news vendor model under any distribution.this critical ratio maxmizes profit.

Usage

```
CriticalRatio(sellingprice, cost, salvage, penality, na.rm = TRUE)
```

Arguments

sellingprice	numeric,selling price of the SKU
cost	numeric,cost of the SKU
salvage	numeric,,salvage or discounted value if sold after season,if there is no salvage , zero is placed in the argument.
penality	numeric, peanlity cost of not satisfying demand if any, if not, zero is placed in the argument.
na.rm	A logical indicating whether missing values should be removed

Value

the critical ratio.

Note

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Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
CriticalRatio(sellingprice=80,cost=60,salvage=45,penality=25,na.rm=TRUE)
```

CSOE *CSOE*

Description

Cost per stockout event

Usage

```
CSOE(quantity, demand, standerddeviation, leadtimeinweeks, cost, costSoe,
  holdingrate, na.rm = TRUE)
```

Arguments

quantity,	numeric,quantity replinished every cycle.
demand	numeric,annual Expected demand of the SKU .
standerddeviation	numeric, standard deviation of the SKU during season.
leadtimeinweeks	numeric,leadtime in weeks of order.
cost	numeric,cost of item.
costSoe	numeric, estimated cost per stockout event.
holdingrate	numeric, holding rate per item per year,percentage.
na.rm	removes na values if TRUE, TRUE by default

Details

Calculating K value that corresponds to the cost per stock out event, how much quantity should be put in stock as a minimum.the function solves for optimum K based on the stock out event. It should be noted that the condition(output) should be bigger than 1. other wise set K as per management.

Value

a dataframe that contains calculations of K and the minimum quantity to be put in stock .

Note

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Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
CSOE(quantity=1000,demand=40000,standerddeviation=200,leadtimeinweeks=3,
cost=500,costSoe=30000,holdingrate=0.2,na.rm=TRUE)
```

`dl.sigmadl` *dl.sigmadl*

Description

claculating demand lead time,saftey stock when there is a leadtime variability.

Usage

```
dl.sigmadl(expected_demand, sd_demand, expected_leadtime, sd_leadtime)
```

Arguments

`expected_demand,`	numeric,expected daily demand .
`sd_demand`	numeric,standard deviation of daily demand .
`expected_leadtime`	numeric, expected leadtime in days.
`sd_leadtime`	numeric,standard deviation of leadtime

Details

calculating leadtime with leadtime variablility as delivery time diffires to long distances and reliability of mode of transport. thus demand leadtime and standard deviation during lead time takes into consideration the lead time variability.

Value

a dataframe that contains calculations of the expected demand lead time and the expected saftey stock during leadtime. It is noted that saftey stock here is more than normal due to leadtime variability.

Note

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Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
dl.sigmadl(expected_demand=100,sd_demand=22,expected_leadtime=12,sd_leadtime=3)
```

---

elasticity *elasticity*

Description

calculating elasticity of price change.

Usage

```
elasticity(salesP1, salesP2, priceP1, priceP2)
```

Arguments

salesP1,	integer, unit sales in period 1.
salesP2	integer unit sales in period 2.
priceP1	numeric, average price of sku in period 1.
priceP2	average price of sku in period 2.

Details

This function is helpful to determine the elasticity of a product with effect to price change, the figure could be negative as the change is price is negative. it translates as for each unit percentage decrease in price , this much is ecpected precentage of increase of sales. condition must be that Price in period one was more than proce in period 2 and sales in period two was more than sales in period 1.

Value

the elasticity ratio in unit sales, the -ve number represents the increase in sales for each decrease of unit currency.

Note

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Author(s)

"haytham omar email: "<haytham@rescaleanalytics.com>"

Examples

```
elasticity(salesP1=50,salesP2=100,priceP1=6,priceP2=4)
```

---

eoq *eoq*

Description

economic order quantity.

Usage

```
eoq(annualdemand, orderingcost, purchasecost, holdingrate, na.rm = TRUE)
```

Arguments

annualdemand	numeric,annual demand of the SKU.
orderingcost,	numeric ordeing cost of the SKU
purchasecost	,numeric, purchase cost per item
holdingrate	numeric holding rate per item per year.
na.rm	A logical indicating whether missing values should be removed

Value

the eoq,cycle stock time in years and cycle stock time in weeks.

Note

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Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
eoq(annualdemand=5000,orderingcost=400,purchasecost=140,holdingrate=0.2,na.rm=TRUE)
```

`eoqsenstivity` *eoqsenstivity*

Description

the rate of increase of total relevant cost compared to the EOQ.

Usage

```
eoqsenstivity(quantity, quantityoptimal, na.rm = TRUE)
```

Arguments

`quantity`	numeric,quantity ordered every order cycle.
`quantityoptimal`	, numeric optimal quantity based on EOQ.
`na.rm`	A logical indicating whether missing values should be removed

Value

the rate of increase of total relevant cost compared to the EOQ.

Note

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Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
eoqsenstivity(quantity=5400,quantityoptimal=6000,na.rm=TRUE)
```

EPN_singleperiod *EPN_singleperiod*

Description

calculating expected profit for a newsvendor model.

Usage

```
EPN_singleperiod(quantity, mean, standerddeviation, p, c, g, b,
  na.rm = TRUE)
```

Arguments

quantity,	numeric,quantity replinished every cycle.
mean	numeric,Expected demand of the SKU during season.
standerddeviation	numeric, standard deviation of the SKU during season.
p	numeric,selling price of the SKU
c	numeric,cost of the SKU
g	numeric,,salvage or discounted value if sold after season,if there is no salvage , zero is placed in the argument.
b	numeric, peanlity cost of not satisfying demand if any, if not, zero is placed in the argument.
na.rm	A logical indicating whether missing values should be removed

Details

calculating expected profit for a newsvendor model. based on assumed normal distribution demand.

Value

a dataframe that contains calculations of the expected profit from a newsvendor model based on normal distribution.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
EPN_singleperiod(quantity=40149,mean= 32000,standerddeviation= 11000,p=24,c=10.9,g=7,b=0,na.rm=TRUE)
```

`EPP_singleperiod` *EPP_singleperiod*

Description

Expected profit from a newsvendor model based on a poisson distribution.

Usage

```
EPP_singleperiod(quantity, lambda, p, c, g, b, na.rm = TRUE)
```

Arguments

`quantity`	numeric,quantity to be ordered during season.
`lambda`	numeric, mean of the demand based on poisson distribution.
`p`	numeric,selling price of the SKU
`c`	numeric,cost of the SKU
`g`	numeric,,salvage or discounted value if sold after season,if there is no salvage , zero is placed in the argument.
`b`	numeric, peanlity cost of not satisfying demand if any, if not, zero is placed in the argument.
`na.rm`	A logical indicating whether missing values should be removed

Details

calculating expected profit for a newsvendor model. based on assumed poisson distribution demand.

Value

a dataframe that contains calculations of the expected profit from a newsvendor model based on poisson distribution.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
EPP_singleperiod(quantity=40149,lambda= 32000,p=24,c=10.9,g=7,b=0,na.rm=TRUE)
```

EUSnorm_singleperiod *EUSnorm_singleperiod*

Description

Calculating expected unit short based on an assumed normal distribution.

Usage

```
EUSnorm_singleperiod(quantity, demand, standerddeviation, na.rm = TRUE)
```

Arguments

quantity,	numeric,quantity replinished every cycle.
demand	numeric,annual Expected demand of the SKU .
standerddeviation	numeric, standard deviation of the SKU during season.
na.rm	logical,TRUE

Details

Calculating expected unit short based on an assumed normal distribution for a newsvendor model.

Value

a dataframe that contains Expected unit short,k and g(k).

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
EUSnorm_singleperiod(quantity=35000,demand=32000,standerddeviation=12000,na.rm=TRUE)
```

`inventorize` *inventorize: Inventory Analytics And Cost Calculations.*

Description

inventory analytics and cost calculations for SKUs.

Author(s)

Maintainer: Haytham Omar <haytham@rescaleanalytics.com>

`inventorymetricsCIS` *inventorymetricsCIS*

Description

calculating inventory metrics based on cost per item short.

Usage

```
inventorymetricsCIS(CIS, demand, standerddeviation, quantity, leadtime,
  cost, holdingrate, na.rm = TRUE)
```

Arguments

`CIS`	numeric,cost per item short determined by management
`demand`	numeric,annual demand of the SKU.
`standerddeviation`	numeric, annual standard deviation
`quantity,`	numeric,quantity replinished every cycle.
`leadtime,`	numeric,leadtime in weeks
`cost,`	numeric cost of the SKU
`holdingrate`	,numeric, holding rate per item/year
`na.rm`	A logical indicating whether missing values should be removed

Details

after cost per item short is explicitly calculated, item fill rate, cost per stock out event and cycle service level are implicitly calculated.

Value

a dataframe that contains demand leadtime,sigmadl(standard deviation in leadtime),saftey factor k determined based on cost per itemshort,unit normal loss function,expected units to be short,cycle service level, fill rate,implied cost per stockout event, saftey stock and suggested reorder point.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
inventorymetricsCIS(CIS= 90, demand= 35000,standerddeviation=9000,
quantity= 9000,leadtime=3 ,cost=90,holdingrate=0.15,na.rm =TRUE)
```

`inventorymetricsCSL` *inventorymetricsCSL*

Description

calculating inventory metrics based on CYCLE SERVICE LEVEL.

Usage

```
inventorymetricsCSL(csl, demand, standerddeviation, quantity, leadtime,
  cost, holdingrate, na.rm = TRUE)
```

Arguments

`csl`	numeric,required times of demand that is fullfilled from cycle stock
`demand`	numeric,annual demand of the SKU.
`standerddeviation`	numeric, annual standard deviation
`quantity,`	numeric,quantity replinished every cycle.
`leadtime,`	numeric,leadtime in weeks
`cost,`	numeric,cost of the SKU.
`holdingrate`	numeric, holding rate per item per year.
`na.rm`	A logical indicating whether missing values should be removed

Details

cycle service level is the desired no of times demand is compleltey fulfiiled from cycle stock,after cycle service level is explicitly calculated, cost per item short, cost per stock out event and item fill rate are implicitly calculated.

Value

a dataframe that contains demand leadtime, sigmadl(standard deviation in leadtime), saftey factor k determined based on item fillrate provided, unit normal loss function, expected units to be short, cycle service level, fill rate,implied cost per stockout event, saftey stock and suggested reorder point.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
inventorymetricsCSL(csl=0.95,demand=20000,standerddeviation=1200,
quantity=4500,leadtime=3,cost=100,holdingrate=0.15,na.rm=TRUE)
```

---

inventorymetricsIFR *inventorymetricsIFR*

Description

calculating inventory metrics based on item fillrate.

Usage

```
inventorymetricsIFR(fillrate, demand, standerddeviation, quantity,
  leadtime, cost, holdingrate, na.rm = TRUE)
```

Arguments

fillrate	numeric,required percentage of demand that is fullfilled from cycle stock
demand	numeric,annual demand of the SKU.
standerddeviation	numeric, annual standard deviation
quantity,	numeric,quantity replinished every cycle.
leadtime,	numeric,leadtime in weeks
cost,	numeric cost of the SKU
holdingrate	,numeric, holding rate per item/year
na.rm	A logical indicating whether missing values should be removed

Details

item fill rate is the percentage of demand that is fullfilled directly from the cycle stock,after item fill rate is explicitly calculated, cost per item short, cost per stock out event and cycle service level are implicitly calculated.

Value

a dataframe that contains demand leadtime, sigmadl(standard deviation in leadtime), saftey factor k determined based on item fillrate provided, unit normal loss function expected units to be short,cycle service level, fill rate,implied cost per stockout event, saftey stock and suggested reorder point.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
inventorymetricsIFR(fillrate= 0.90, demand= 35000,standerddeviation=9000,
quantity= 5000,leadtime=3 ,cost=50,holdingrate=0.15,na.rm=TRUE)
```

MPN_singleperiod *MPN_singleperiod*

Description

calculating expected profit for a newsvendor model based on critical ratio.

Usage

```
MPN_singleperiod(mean, standerddeviation, p, c, g, b, na.rm = TRUE)
```

Arguments

mean	numeric,Expected demand of the SKU during season.
standerddeviation	numeric, standard deviation of the SKU during season.
p	numeric,selling price of the SKU
c	numeric,cost of the SKU
g	numeric,,salvage or discounted value if sold after season,if there is no salvage , zero is placed in the argument.

b	numeric, peanlity cost of not satisfying demand if any, if not, zero is placed in the argument.
na.rm	A logical indicating whether missing values should be removed

Details

calculating expected profit for a newsvendor model. based on assumed normal distribution demand.

Value

a dataframe that contains calculations of the maximum expected profit from a newsvendor model based on normal distribution.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
MPN_singleperiod(mean= 32000,standerddeviation= 11000,p=24,c=10.9,g=7,b=0,na.rm=TRUE)
```

MPP_singleperiod *MPP_singleperiod*

Description

Maximum profit from a newsvendor model based on a poisson distribution.

Usage

```
MPP_singleperiod(lambda, p, c, g, b, na.rm = TRUE)
```

Arguments

lambda	numeric, mean of the demand based on poisson distribution.
p	numeric,selling price of the SKU
c	numeric,cost of the SKU
g	numeric,,salvage or discounted value if sold after season,if there is no salvage , zero is placed in the argument.
b	numeric, peanlity cost of not satisfying demand if any, if not, zero is placed in the argument.
na.rm	A logical indicating whether missing values should be removed

Details

calculating expected profit for a newsvendor model. based on assumed poisson distribution demand based on the critical ration.

Value

a dataframe that contains calculations of the maximum expected profit from a newsvendor model based on poisson distribution.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
MPP_singleperiod(lambda= 32000,p=24,
c=10.9,g=7,b=0,na.rm=TRUE)
```

---

productmix *productmix*

Description

Identyfing ABC category based on the pareto rule for both demand and selling price,a mix of nine categories are produced. Identyfing ABC category based on the pareto rule.A category is up to 80

Usage

```
productmix(SKUs, sales, revenue, na.rm = TRUE)
```

Arguments

SKUs,	charachter, a vector of SKU names.
sales,	vector, a vector of items sold per sku, should be the same number of rows as SKU.
revenue	price vector, a vector of total revenu per sku, should be the same number of rows as SKU.
na.rm	, logical and by default is TRUE

Value

a dataframe that contains ABC categories with a bar plot of the count of items in each category.

Note

this is the first version of the inventorize package, all the fucntions are common knowlege for supply chain without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
productmix(SKUs=c(1:100),sales=runif(100,1,1000),revenue = rnorm(100,200,10),na.rm=TRUE)
```

---

productmix_storelevel *productmix_storelevel*

Description

Identyfing ABC category based on the pareto rule for both demand and selling price,a mix of nine categories are produced. Identyfing ABC category based on the pareto rule.A category is up to 80 in this fuction the data is splitted by store and a product mix is made on each store individually.

Usage

```
productmix_storelevel(SKUs, sales, revenue, storeofsku, na.rm = TRUE)
```

Arguments

SKUs,	charachter, a vector of SKU names.
sales,	vector, a vector of items sold per sku, should be the same number of rows as SKUs.
revenue	vector, a vector of total revenue per sku, should be the same number of rows as SKUs.
storeofsku	vector, which store the SKU is sold at.should be the same number of rows as SKUs.
na.rm,	logical and by default is TRUE

Value

a dataframe that contains ABC categories by store with a bar plot of the count of items in each category.

Note

this is the first version of the inventorize package, all the fucntions are common knowlege for supply chain without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
productmix_storelevel(c(1:1000),sales = runif(1000,4,10000),
revenue  = rnorm(1000,100,20),storeofsku = rep(seq(1:10),100))
```

`profit_max` *profit_max*

Description

maxmizing profit based on chage in price and elasticity.

Usage

```
profit_max(cost, salesP1, salesP2, priceP1, priceP2, na.rm = TRUE)
```

Arguments

`cost,`	numeric, cost of the SKU.
`salesP1,`	integer, unit sales in period 1.
`salesP2`	integer unit sales in period 2.
`priceP1`	numeric, average price of sku in period 1.
`priceP2`	average price of sku in period 2.
`na.rm`	logical with a default of TRUE

Details

This function is helpful to determine the elasticity of a product with effect to price change, the figure could be negative as the change is price is negative. it translates as for one currency unit change in price, this much is ecpected in units in increase of sales. condition must be that Price in period one was more than price in period 2 and sales in period two was more than sales in period 1. a proposed price is given to period 3 which is future period to maxmize profit. it is advisable that elasticity to be calibrated by testing it on several periods. this function does not take into account advertising and campaigns,i.e external factors. yet it's a good indicator of best pricing per SKU.

Value

the elasticity ratio in unit sales, the -ve number represents the increase in sales for each decrease of unit currency.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
profit_max(cost=2,salesP1=50,salesP2=100,priceP1=6,priceP2=4)
```

`profit_max_withfixedcost`
profit_max_withfixedcost

Description

maxmizing profit based on chage in price and elasticity taking into consideration fixed and variable costs.

Usage

```
profit_max_withfixedcost(fixed_cost, variable_cost, salesP1, salesP2,
  priceP1, priceP2)
```

Arguments

`fixed_cost,`	numeric, fixed cost for ordering and handling the SKU.
`variable_cost,`	numeric, the cost of the SKU, changing by quantity.
`salesP1,`	integer, unit sales in period 1.
`salesP2`	integer unit sales in period 2.
`priceP1`	numeric, average price of sku in period 1.
`priceP2`	average price of sku in period 2.

Details

This function is helpful to determine the elasticity of a product with effect to price change, the figure could be negative as the change is price is negative. it translates as for one currency unit change in price, this much is ecpected in units in increase of sales. condition must be that Price in period one was more than price in period 2 and sales in period two was more than sales in period 1. a proposed price is given to period 3 which is future period to maxmize profit. it is advisable that elasticity to be calibrated by testing it on several periods. this function does not take into account advertising and campaigns,i.e external factors. yet it's a good indicator of best pricing per SKU.

Value

the elasticity ratio in unit sales, the -ve number represents the increase in sales for each decrease of unit currency.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
profit_max_withfixedcost(fixed_cost=200,variable_cost=20,salesP1=50,salesP2=100,priceP1=6,priceP2=4)
```

`reorderpoint` *reorderpoint*

Description

Calculating saftey stock based on the cycle service level.

Usage

```
reorderpoint(dailydemand, dailystandarddeviation, leadtimein_days, csl,
  na.rm = TRUE)
```

Arguments

`dailydemand`	numeric,daily Expected demand of the SKU .
`dailystandarddeviation`	numeric, standard deviation of daily demand of the SKU .
`leadtimein_days`	leadtime in days of order..
`csl`	cycle service level requested
`na.rm`	Logical, remove na if TRUE

Details

Calculating re-order point based on demand variability without lead time variability in an assumed normal distribution. cycle service level is provided to calculate saftey stock accordingly.

Value

a dataframe that contains demand lead time,sigmadl,safteyfactor and re_order point.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
reorderpoint(dailydemand=50,dailystandarddeviation=5,leadtimein_days=6,csl=0.90)
```

`reorderpoint_leadtime_variability`
reorderpoint_leadtime_variability

Description

Calculating saftey stock based on the cycle service level.

Usage

```
reorderpoint_leadtime_variability(dailydemand, dailystandarddeviation,
  leadtimein_days, sd_leadtime_days, csl, na.rm = TRUE)
```

Arguments

`dailydemand`	numeric,daily Expected demand of the SKU .
`dailystandarddeviation`	numeric, standard deviation of daily demand of the SKU .
`leadtimein_days`	leadtime in days of order.
`sd_leadtime_days`	standard deviation of leadtime in days of order.
`csl`	cycle service level requested
`na.rm`	Logical, remove na if TRUE

Details

Calculating re-order point based on demand variability and lead time variability in an assumed normal distribution. cycle service level is provided to calculate saftey stock accordingly.

Value

a dataframe that contains demand lead time,sigmadl,safteyfactor and re_order point.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
reorderpoint_leadtime_variability(dailydemand=50,dailystandarddeviation=5,
leadtimein_days=6,sd_leadtime_days=2,csl=0.90)
```

---

revenue_max *revenue_max*

Description

maxmizing revenue based on chage in price and elasticity.

Usage

```
revenue_max(salesP1, salesP2, priceP1, priceP2, na.rm = TRUE)
```

Arguments

salesP1,	integer, unit sales in period 1.
salesP2	integer unit sales in period 2.
priceP1	numeric, average price of sku in period 1.
priceP2	average price of sku in period 2.
na.rm	logical with a default of TRUE

Details

#' This function is helpful to determine the elasticity of a product with effect to price change, the figure could be negative as the change is price is negative. it translates as for each unit percentage decrease in price , this much is ecpected precentage of increase of sales. condition must be that Price in period one was more than proce in period 2 and sales in period two was more than sales in period 1. a proposed optimum price is given to period 3 which is future period to maxmize revenue.

Value

the elasticity ratio in unit sales, the -ve number represents the increase in sales for each decrease of unit currency.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
revenue_max(salesP1=50,salesP2=100,priceP1=6,priceP2=4)
```

safteystock_CIS_normal *safteystock_CIS_normal*

Description

Calculating K value that reduces cost per item short.

Usage

```
safteystock_CIS_normal(quantity, demand, standerddeviation,
  leadtimeinweeks, cost, Citemshort, holdingrate, na.rm = TRUE)
```

Arguments

quantity,	numeric,quantity replinished every cycle.
demand	numeric,annual Expected demand of the SKU .
standerddeviation	numeric, standard deviation of the SKU during season.
leadtimeinweeks	leadtime in weeks or order.
cost	numeric,cost of the SKU
Citemshort	numeric, peanlity cost of not satisfying demand if any, if not, zero is placed in the argument.
holdingrate	numeric,,holding charge per item per year.
na.rm	Logical, True to remove na.

Details

Calculating K value that reduces cost per item short inventory metric based on an assumed normal distribution.

Value

a dataframe that contains calculations of K the cost per item short metric noting that condition must me less than 1.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
safteystock_CIS_normal(quantity=3000,demand=50000,standerddeviation=4000,
leadtimeinweeks=4,cost=90,Citemshort=15,holdingrate=0.15,na.rm=TRUE)
```

`safteystock_CSL_normal` *safteystock_CSL_normal*

Description

calculating saftey stock based on cycle service level rate.

Usage

```
safteystock_CSL_normal(rate, quantity, demand, standerddeviation, leadtime,
  na.rm = TRUE)
```

Arguments

`rate,`	cycle service level requested.
`quantity`	quantity ordered every cycle.
`demand`	numeric, expected annual demand of the SKU.
`standerddeviation`	numeric annual standard deviation of the demand.
`leadtime`	numeric,leadtime of order in weeks.
`na.rm`	logical with a default of TRUE

Details

calculating saftey stock and expected unit short based on the cycle service identified assuming a normal distribution.

Value

a dataframe that contains calculations of the expected profit from a newsvendor model based on normal distribution.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
safteystock_CSL_normal(rate=0.95,quantity=30000,demand=28000,standerddeviation=5000,8,na.rm=TRUE)
```

safteystock_IFR_normal *safteystock_IFR_normal*

Description

Calculating K value corresponding to item fill rate.

Usage

```
safteystock_IFR_normal(rate, quantity, demand, standerddeviation, leadtime,
  na.rm = TRUE)
```

Arguments

rate	numeric, item fill rate.
quantity,	numeric,quantity replinished every cycle.
demand	numeric,annual Expected demand of the SKU .
standerddeviation	numeric, standard deviation of the SKU during season.
leadtime	leadtime in weeks of order.
na.rm	Logical, TRUE to remove na.

Details

Calculating K value that corresponds to the desired item fill rate.

Value

a dataframe that contains calculations of K the item fill rate metric.cycle service level and expected unit short.

Note

this is the first version of the inventorize package, all the fucntions are basic knowlege for supply chain without any contribution from my side, the aim is to facilitate and ease much of the book-keeping that is endured during stock analysis.

Author(s)

"haytham omar email: <h.omar5942@gmail.com>"

Examples

```
safteystock_IFR_normal(rate=0.97,quantity=9000,demand=100000,
standerddeviation=5000,leadtime=4,na.rm=TRUE)
```

saftey_stock_normal *saftey_stock_normal*

Description

Calculating saftey stock based on the cycle service level.

Usage

```
saftey_stock_normal(annualdemand, annualstandarddeviation, leadtimeinweeks,
  csl, na.rm = TRUE)
```

Arguments

annualdemand	numeric,annual Expected demand of the SKU .
annualstandarddeviation	numeric, standard deviation of the SKU during season.
leadtimeinweeks	leadtime in weeks or order.
csl	cycle service level requested
na.rm	Logical, remove na if TRUE

Details

Calculating saftey stock based on the cycle service level in an assumed normal distribution.

Value

a dataframe that contains calculations of K the cost per item short metric noting that condition must me less than 1.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
saftey_stock_normal(annualdemand=8000,annualstandarddeviation=600,
leadtimeinweeks=4,csl=0.92,na.rm=TRUE)
```

`total.logistics.cost` *total.logistics.cost*

Description

calculating total logistics cost .

Usage

```
total.logistics.cost(quantity, expected_annual_demand, sd_annual_demand,
  expected_leadtimeindays, sd_leadtime, costperunit, transportcost,
  holdingrate, ordering_cost, csl)
```

Arguments

`quantity`	quantity ordered every cycle.
`expected_annual_demand`	numeric, expected annual demand of the SKU.
`sd_annual_demand`	annual standard deviation of the SKU.
`expected_leadtimeindays`	expected lead time in days.
`sd_leadtime`	standard deviation of leadtime
`costperunit`	purchase cost of the SKU
`transportcost`	transport cost of the SKU
`holdingrate`	holding rate of the SKU
`ordering_cost`	ordering cost per order placed
`csl`	cycle service level desired

Details

calculating total logistics cost based on a normal distribution.

Value

a dataframe that contains calculations of the total logistics cost in detail.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
total.logistics.cost(quantity=32,expected_annual_demand=1550,
sd_annual_demand=110,expected_leadtimeindays=64,sd_leadtime=8,
costperunit=107,transportcost=22,holdingrate=0.15,ordering_cost=500,csl=0.95)
```

`TQpractical` *TQpractical*

Description

Identyfing Practical ordering quantity based on the economic order quantity.it is assumed that practical order quantity will be always withing 6

Usage

```
TQpractical(annualdemand, orderingcost, purchasecost, holdingrate,
  na.rm = TRUE)
```

Arguments

`annualdemand,`	numeric annual demand of the SKU.
`orderingcost,`	numeric ordering cost of the SKU.
`purchasecost`	numeric purchase cost of the SKU.
`holdingrate`	numeric holding rate of the SKU.
`na.rm`	logical, TRUE.

Value

a dataframe that contains the economic order quantity and the practical order quantity, Tstar (optimum)and Tpractical which is always away from the optimum up to 6

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Examples

```
TQpractical(annualdemand=1000,orderingcost=100,purchasecost=72,holdingrate=0.25,na.rm=TRUE)
```

TRC *TRC*

Description

Identyfing Total relevant cost.

Usage

```
TRC(annualdemand, orderingcost, purchasecost, holdingrate, na.rm = TRUE)
```

Arguments

annualdemand	numeric annual demand of the SKU.
orderingcost	numeric ordering cost of the SKU.
purchasecost	numeric purchase cost of the SKU.
holdingrate	numeric holding rate of the SKU.
na.rm	logical, TRUE to remove na.

Note

this is the second version of the inventorize package, all the fucntions are without any academic contribution from my side, the aim is to facilitate and ease much of the bookkeeping that is endured during stock analysis.

Author(s)

"haytham omar email: <haytham@rescaleanalytics.com>"

Examples

```
TRC(annualdemand=2500,orderingcost=250,purchasecost=98,holdingrate=0.25,na.rm=TRUE)
```

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