Package 'CLSIEP15'

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Type Package

Title Clinical and Laboratory Standards Institute (CLSI) EP15-A3 Calculations

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Description Calculations of ``EP15-A3 document. A manual for user verification of precision and estimation of bias'' CLSI (2014, ISBN:1-56238-966-1).

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Depends R (>= 4.0)

Imports stats, dplyr, tidyr

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Contents

`bias_validation_interval` *Calculate bias validation interval*

Description

Calculate bias validation interval

Usage

```
bias_validation_interval(TV, m, se_c)
```

Arguments

`TV`	True value
`m`	factor
`se_c`	SE Combined

Value

named list with the interval

calculate_aov_infos *Calculate ANOVA Results and Imprecision Estimates*

Description

Calculate ANOVA Results and Imprecision Estimates

Usage

```
calculate_aov_infos(ep_15_table)
```

Arguments

ep_15_table	table generated from create_table_ep_15()

Value

Named list with ANOVA Results and Imprecision Estimates

Examples

```
calculate_aov_infos(create_table_ep_15(CLSIEP15::ferritin_long, data_type = 'long'))
```

calculate_bias_interval *Calculate bias interval from TV*

Description

Calculate bias interval from TV

Usage

```
calculate_bias_interval(
  scenario,
  nrun,
  nrep,
  SWL,
  SR,
  nsamples,
  expected_mean,
  user_mean,
  ...
)
```

Arguments

scenario	Choosed scenario from section 3.3 of EP15-A3
nrun	Number of runs
nrep	number of repetitions per run (n0)
SWL	S within laboratory (obtained from anova)
SR	S repetability (obtained from anova)
nsamples	total number of samples tested usual 1
expected_mean	Expected mean or TV
user_mean	Mean of all samples (obtained from anova)
...	additional parameters necessary for processing the choosed scenario

Value

a named list with the defined mean, the interval significance (user mean should be in for approval), and total bias (user mean - TV)

Examples

```
calculate_bias_interval(scenario = 'E',
nrun = 7,
nrep = 5,
SWL = .042,
SR = .032,
nsamples = 2,
expected_mean = 1,
user_mean = .94
)
```

---

calculate_dfWL *Calculate degres of freedom within-lab as specified in appendix B*

Description

Calculate degres of freedom within-lab as specified in appendix B

Usage

```
calculate_dfWL(cvr_manufacture, cvwl_manufacture, k, n0, N)
```

Arguments

`cvr_manufacture`	CV repeatability informed by the manufacturer
`cvwl_manufacture`	CV within-lab informed by the manufacturer
`k`	the number of runs
`n0`	the "average" number of results per run
`N`	the total number of replicates

Value

dfwl

`calculate_df_combined` *Calculate degrees of freedom of SE C (SE combined) given a selected scenario and additional parameters necessary for the scenario*

Description

Calculate degrees of freedom of SE C (SE combined) given a selected scenario and additional parameters necessary for the scenario

Usage

```
calculate_df_combined(scenario, ...)
```

Arguments

`scenario`	Scenario (A, B, C, D, E)
`...`	additional parameters necessary for the scenario

Value

DF

calculate_F_uvl *Calculate the UVL factor*

Description

Calculate the UVL factor

Usage

```
calculate_F_uvl(nsamp = 1, df, alpha = 0.05)
```

Arguments

nsamp	n samples in the study
df	degres of freedom
alpha	confidence level

Value

Uvl factor

calculate_m *Calculate M*

Description

Calculate M

Usage

```
calculate_m(df, conf.level = 95, nsamples = 1)
```

Arguments

df	degrees of freedom
conf.level	confidence interval
nsamples	number of samples

Value

m factor

calculate_n0 *Calculate n0*

Description

Calculate n0

Usage

```
calculate_n0(long_result_table)
```

Arguments

long_result_table	table generated by create_table_ep_15 function

Value

The n0 number which refers to Number of Results per Run

calculate_se_c *Calculate SE combined based on SE X and SE RM*

Description

Calculate SE combined based on SE X and SE RM

Usage

```
calculate_se_c(se_x, se_rm)
```

Arguments

se_x	SE X
se_rm	SE RM

Value

SE C

`calculate_se_rm` *Calculate SE RM given a scenario and a list of additional args that can change based on the selected scenario or sub scenario*

Description

Calculate SE RM given a scenario and a list of additional args that can change based on the selected scenario or sub scenario

Usage

```
calculate_se_rm(scenario, additional_args)
```

Arguments

`scenario`	scenario (A, B, C, D, E)
`additional_args`	additional arguments list

Value

SE RM

`calculate_se_rm_a_lowerupper` *Calculate SE RM for scenario A when f the manufacturer supplies lower and upper limits and coverage confidence interval (95 or 99...)*

Description

Calculate SE RM for scenario A when f the manufacturer supplies lower and upper limits and coverage confidence interval (95 or 99...)

Usage

```
calculate_se_rm_a_lowerupper(upper, lower, coverage)
```

Arguments

`upper`	upper limit
`lower`	lower limit
`coverage`	coverage

Value

SE RM

`calculate_se_rm_a_u` *Calculate SE RM for scenario A when "standard error" or "standard uncertainty" (abbreviated by lowercase "u") or "combined standard uncertainty" (often denoted by "uC ")*

Description

Calculate SE RM for scenario A when "standard error" or "standard uncertainty" (abbreviated by lowercase "u") or "combined standard uncertainty" (often denoted by "uC ")

Usage

```
calculate_se_rm_a_u(u)
```

Arguments

`u`	"standard error" or "standard uncertainty" (abbreviated by lowercase "u") or "combined standard uncertainty" (often denoted by "uC ")

Value

SE RM

`calculate_se_rm_a_Ucoverage` *Calculate SE RM for scenario A when f the manufacturer supplies an "expanded uncertainty" (abbreviated by uppercase "U") for the TV and coverage e.g. 95 or 99,*

Description

Calculate SE RM for scenario A when f the manufacturer supplies an "expanded uncertainty" (abbreviated by uppercase "U") for the TV and coverage e.g. 95 or 99,

Usage

```
calculate_se_rm_a_Ucoverage(U, coverage)
```

Arguments

`U`	expanded uncertainty
`coverage`	coverage

Value

SE RM

`calculate_se_rm_a_Uk` *Calculate SE RM for scenario A when f the manufacturer supplies an "expanded uncertainty" (abbreviated by uppercase "U") for the TV and the "coverage factor" (abbreviated by "k")*

Description

Calculate SE RM for scenario A when f the manufacturer supplies an "expanded uncertainty" (abbreviated by uppercase "U") for the TV and the "coverage factor" (abbreviated by "k")

Usage

```
calculate_se_rm_a_Uk(U, k)
```

Arguments

`U`	expanded uncertainty
`k`	coverage factor

Value

SE RM

`calculate_se_rm_scenario_b_c`
Calculate SE RM for scenario B or C If the reference material has a TV determined by PT or peer group results

Description

Calculate SE RM for scenario B or C If the reference material has a TV determined by PT or peer group results

Usage

```
calculate_se_rm_scenario_b_c(sd_rm, nlab)
```

Arguments

`sd_rm`	SD RM
`nlab`	number of lab or peer group results

Value

SE RM

calculate_se_rm_scenario_d_e

Calculate SE RM for scenario D or E If the TV represents a conventional quantity value or When working with a commercial QC material supplied with a TV for which the standard error cannot be estimated

Description

Calculate SE RM for scenario D or E If the TV represents a conventional quantity value or When working with a commercial QC material supplied with a TV for which the standard error cannot be estimated

Usage

```
calculate_se_rm_scenario_d_e()
```

Value

SE RM

calculate_se_x

Calculate SE x

Description

Calculate SE x

Usage

```
calculate_se_x(nrun, nrep, SWL, SR)
```

Arguments

nrun	Run number
nrep	Number of repetitions per run n0
SWL	SWL from aov table
SR	SR from aov table

Value

SE X

calculate_uvl_info *Calculate upper verification limit*

Description

Generic function for calculating UVL the return is a named list and cv_uvl_r and cv_uvl_wl depends on what is the input (S or CV) if the input is SR and SWL the returns is S

Usage

```
calculate_uvl_info(aov_return, nsamp = 1, cvr_or_sr, cvwl_or_swl)
```

Arguments

aov_return	Return of calculate_aov_info()
nsamp	number of samples in the experiment
cvr_or_sr	Desirable CV or S repetability
cvwl_or_swl	Desirable CV or S within-lab

Value

Named list with UVL params

Examples

```
data <- create_table_ep_15(ferritin_wider)
aov_t <- calculate_aov_infos(data)
calculate_uvl_info(aov_t, nsamp = 5, cvr_or_sr = .43, cvwl_or_swl = .7)
```

create_table_ep_15 *Create table for precision calculations*

Description

Create table for precision calculations

Usage

```
create_table_ep_15(data, data_type = "wider")
```

Arguments

data	a long or a wider data.frame with the same structure of CLSIEP15::ferritin_long or CLSIEP15::ferritin_wider
data_type	c('wider', 'long')

Value

a data.frame with renamed columns and structure adjustments

Examples

```
data <- create_table_ep_15(ferritin_long, data_type = "longer")
```

---

dfc_references *Reference of degrees of freedon based on tau given in the CLSI Manual*

Description

Reference of degrees of freedon based on tau given in the CLSI Manual

Usage

```
dfc_references
```

Format

'dfc_references' A data frame with 390 rows and 4 columns:

tau tau

df degrees of freedon

labs number of labs or peers

runs number of runs ...

Source

CLSI EP15-A3

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ferritin_long *Ferrtin data used in CLSI document examples in wide format*

Description

Ferrtin data used in CLSI document examples in wide format

Usage

```
ferritin_long
```

Format

'ferritin_long' A data frame with 25 rows and 3 columns:

rep Repetition of sample

name Run of the Runs obtained from 5 distinct days

value result of the observation ...

Source

CLSI EP15-A3

`ferritin_wider` *Ferrtin data used in CLSI document examples in wide format*

Description

Ferrtin data used in CLSI document examples in wide format

Usage

```
ferritin_wider
```

Format

'ferritin_wider' A data frame with 5 rows and 6 columns:

rep Repetition of sample

Run_1, Run_2, Run_3, Run_4, Run_5 Runs from 5 distinct days ...

Source

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