Package ‘PIPS’

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Type Package

Title Predicted Interval Plots

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Generate Predicted Interval Plots

Description

Generate Predicted Interval Plots. Simulate and plot confidence intervals of an effect estimate given observed data and a hypothesis about the distribution of future data.

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Note

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LL, HU, and SRE contributed code that created predicted interval plots (PIPS) for time to event analyses. LMS provided enhancements for time-to-event outcomes. (Time-to-event outcomes are not yet supported by the package, but these programs aided our design.) HC wrote code for binary outcomes. LD and SM wrote for normal outcomes. DGM consolidated, modularized, and improved these contributions. RG finished the modularization and tested. SRE provided statistical concepts/methodology.

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Maintainer: Ray Griner <rgriner@sdac.harvard.edu>

References


See Also

pred.int
plot.pred.int
print.pred.int

Examples

# Make some fake data
myY<–c(rep(1Ltimes=RPILrep(PLtimes=8PILrep(1Ltimes=RUILrep(PLtimes=RUII
mygroup<–c(rep(G1PILrep(G2PILrep(G3

# Run the programs
pips <- pred.int(y=myY, group=mygroup, n=c(200,100),
                data.type="binary", iters=100)
print(pips)
plot(pips)

# Run demo(package="PIPS") for more examples.

plot.pred.int

Description

Plot objects of class pred.int for predicted interval plots

Usage

## S3 method for class 'pred.int'
plot(x, conf.int = TRUE, vline = NA, which = NULL, axes = TRUE,
     pi.col.fun=NULL, ci.col=2, main, xlab, ylab, xlim, ...)
Arguments

x
Object of class pred.int containing the PIPs data for plotting

conf.int
Print confidence interval for observed data? TRUE (default)/FALSE

vline
Vector of x-values for vertical lines to print on the graph. These may represent
superiority/inferiority bounds or other x-values of interest

which
Only create graphs for some of the comparisons

axes
TRUE/FALSE. Print axes on graph? Default is TRUE. Probably you should
only suppress axes now if you will add them later (for example if you don’t like
the default axes)

pi.col.fun
An optional one parameter function that takes a number between 0 and 100 and
returns a color. This can be used to color the predicted intervals different colors.
The input argument is the position of the interval on the vertical axis of the
graph. Default coloring is three shades of gray: Percentiles (0-10) and (90-100)
are light gray, (10-25) and (75-90) are darker, and (25-75) is darkest

ci.col
Color for effect estimate and confidence interval for the observed data. Default
is 2 (second color in palette).

main
Main title of graph. If blank, a default will be used. Can be either a single title or
a vector of titles. If a vector, the first will be used for the first graph, the second
for the second graph, etc... If any title contains the string "#BY#", this will be
replaced with the name of the comparison (i.e. "B vs A")

xlab
Label on xaxis. If blank, a default will be used.

ylab
Label on xaxis. If blank, a default will be used.

xlim
Limits of xaxis (as vector of length 2). Default is large enough to contain the
predicted intervals and confidence interval. Limits narrower than the defaults
will be ignored.

... Other options will be passed through to the plot.default function.

Value

No return value. Called for its side effect.

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Hajime Uno, and Laura M. Smeaton.

See package documentation for affiliations and contributions.

References

Evans SR, Li L, Wei LJ, "Data Monitoring in Clinical Trials Using Prediction", Drug Information

Li L, Evans SR, Uno H, Wei LJ. "Predicted Interval Plots: A Graphical Tool for Data Monitoring
pred.int

See Also

PIPS
pred.int
print.pred.int

Examples

# Make some fake data
myY <- c(rep(1, times=20), rep(0, times=80), rep(1, times=25), rep(0, times=25))
myGroup <- c(rep('A', 100), rep('B', 50))

# Run the programs
pips <- pred.int(y=myY, group=myGroup, N=c(200, 100),
                  data.type="binary", iters=100)
print(pips)
plot(pips)

# Run demo(package="PIPS") for more examples.

pred.int  Generates predicted intervals for predicted interval plots

Description

Generates predicted intervals of some effect estimate given observed data and a hypothesis about the distribution of future data.

Usage

pred.int(y, group = NA, N, true.y = "observed", ref = NA,
         data.type = c("t.test", "binary"), var.equal = FALSE,
         conf.level = 0.95, obs.conf.level=NA, iters = 100)

Arguments

y  a numeric vector of outcomes (with at least 2 elements and no missing values)
group an optional vector of groups. If it exists, it must be the same length as y with no missing values. If missing, all observations put in the same group, and one-sample analyses are performed. See 'Details' for more information.
N   A required vector with length equal to the number of distinct groups. The ith element is what we want the number of observations to be for the ith group after simulation. (So if y is length 150 and only one group, then to simulate 50 outcomes we pass N=200.)
true.y Either "observed","no.diff", or a vector of constants. Define mean/proportion used when simulating the data.
The `pred.int` function takes a vector of observations \( y \) as well as (optionally) the group of each observation \( \text{group} \), and the total number of observations expected in each group \( N \) when all data is observed. The function then calculates the amount of data that needs to be simulated in each group, and simulates the outcome, which is either binary or normal depending on the value of `data.type`.

When simulating data, the parameter `true.y` determines the mean/proportion of the population from which the simulated data will be drawn. This is either the observed mean/proportion (`true.y = "observed"`), the pooled mean/proportion (`true.y = "no.diff"`), or a vector of constants (representing the mean/proportion in each group).

Selecting `data.type = "t.test"` with more than one group generates confidence intervals using a t.test either under the assumption of equal variance if `var.equal = TRUE` or unequal variance if `var.equal = FALSE`. In the latter case the degrees of freedom are corrected using Satterthwaite’s approximation.

Selecting `data.type = "binary"` generates confidence intervals using a test for equality of proportions (similar to that calculated in `prop.test`). A continuity correction is not applied.

When there is more than one group, the program treats one group as the reference group and generates \( N-1 \) sets of predicted intervals (where \( N \) is the number of groups), where each group is compared to the reference group. When all the observations are in the same group (or no group vector was provided) one-sample tests are performed.

An object of class `pred.int` is returned, which is a list of the following:

- `obs.mean` Observed mean for each group (vector with length = \( n(\text{groups}) \))
- `obs.n` Observed \( n \) for each group
- `sim.n` Number simulated for each group
- `ci` A list of vectors of length 3 that contain the point estimate, lower, and upper confidence intervals for the observed effect. There are \( n(\text{groups})-1 \) elements in the list (one for each comparison/graph)
pi A list of matrices with 3 columns and iters rows. The columns are the point estimate and lower/upper confidence limit for each predicted interval. There are (n(groups)-1) matrices in the list (one for each comparison/graph).

data.type Data type (passed from input parameter)

conf.level Confidence level used for predicted intervals (passed from input parameter)

obs.conf.level Confidence level used for observed intervals (see obs.conf.level input parameter)

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See package documentation for affiliations and contributions.

References


See Also

PIPS

plot.pred.int

print.pred.int

Examples

# Make some fake data
myY<-(rep(1, times=20), rep(0, times=80), rep(1, times=25), rep(0, times=25))
myGroup<-(rep('A', 100), rep('B', 50))

# Run the programs
pips <- pred.int(y=myY, group=myGroup, N=c(200, 100),
data.type="binary", iters=100)
print(pips)
plot(pips)
print.pred.int  

Print objects of class pred.int for predicted interval plots

Description

Print objects of class pred.int for predicted interval plots

Usage

## S3 method for class 'pred.int'
print(x, pi.count = 8, 
    digits = max(3,getOption("digits") - 3), ...)

Arguments

x Object of class pred.int to print
pi.count Number of predicted intervals to print. Default is 8.
digits Number of digits to print. Default is max(3,getOption("digits")-3)
... Additional arguments to pass to print.default

Value

Returns a copy of the object passed

Author(s)

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See package documentation for affiliations and contributions.

References


See Also

PIPS  
pred.int  
plot.pred.int
Examples

# Make some fake data
myY <- c(rep(1, times=20), rep(0, times=80), rep(1, times=25), rep(0, times=25))
myGroup <- c(rep('A', 100), rep('B', 50))

# Run the programs
pips <- pred.int(y=myY, group=myGroup, N=c(200, 100),
                 data.type="binary", iters=100)
print(pips)
plot(pips)
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