Package 'interactionTest'

October 13, 2022

Type Package

Title Calculates Critical Test Statistics to Control False Discovery Rates in Marginal Effects Plots

Version 1.2

Date 2019-6-6

Author Justin Esarey and Jane Lawrence Sumner

Maintainer Justin Esarey <justin@justinesarey.com>

Description Implements the procedures suggested in Esarey and Sumner (2017) <http://justinesarey.com/interaction-overconfidence.pdf> for controlling the false discovery rate when constructing marginal effects plots for models with interaction terms.

Depends stats, R (>= 3.4)

License GPL

LazyData true

RoxygenNote 6.1.1

Encoding UTF-8

NeedsCompilation no

Repository CRAN

Date/Publication 2019-06-06 21:00:03 UTC

R topics documented:

bootFun 2
fdrInteraction 2
findMultiLims 4
legfig 4

Index **6**

bootFun *Bootstrapping t-statistics*

Description

This function is defunct.

Usage

```
bootFun(...)
```

Arguments

...	Any argument to the function (ignored).

References

Esarey, Justin, and Jane Lawrence Sumner. 2018. "Corrigendum to 'Marginal Effects in Interaction Models: Determining and Controlling the False Positive Rate.'"

fdrInteraction *Critical t-statistic*

Description

This function calculates the critical t-statistic to limit the false discovery rate (Benjamini and Hochberg 1995) for a marginal effects plot to a specified level.

Usage

```
fdrInteraction(me.vec, me.sd.vec, df, type = "BH", level = 0.95)
```

Arguments

me.vec	A vector of marginal effects.
me.sd.vec	A vector of standard deviations for the marginal effects.
df	Degrees of freedom.
type	Should the BH (Benjamini and Hochberg 1999) or BY (Benjamini and Yekutieli 2000) correction be used? Options are "BH" (the default) or "BY".
level	The level of confidence. Defaults to 0.95.

Value

The critical t-statistic for the interaction.

Author(s)

Justin Esarey and Jane Lawrence Sumner

References

Benjamini, Yoav, and Yosef Hochberg. 1995. "Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing." *Journal of the Royal Statistical Society, Series B* 57(1): 289-300.

Benjamini, Yoav, and Daniel Yekutieli. 2001. "The Control of the False Discovery Rate in Multiple Testing Under Dependency." *The Annals of Statistics* 29(4): 1165-1188.

Clark, William R., and Matt Golder. 2006. "Rehabilitating Duverger's Theory." *Comparative Political Studies* 39(6): 679-708.

Esarey, Justin, and Jane Lawrence Sumner. 2017. "Marginal Effects in Interaction Models: Determining and Controlling the False Positive Rate." *Comparative Political Studies* 51(9): 1144-1176.

Esarey, Justin, and Jane Lawrence Sumner. 2018. "Corrigendum to 'Marginal Effects in Interaction Models: Determining and Controlling the False Positive Rate.'"

Examples

```
## Not run:
data(legfig)               # Clark and Golder 2006 replication data

# limit to established democracies from the 1990s
dat<-subset(legfig, subset=(nineties==1 & old==1))

lin.mod <- lm(enep1 ~ eneg + logmag + logmag_eneg + uppertier_eneg + uppertier +
proximity1 + proximity1_enpres + enpres, data=dat)

# save betas
beta.mod <- coefficients(lin.mod)
# save vcv
vcv.mod <- vcov(lin.mod)

# calculate MEs
mag <- seq(from=0.01, to=5, by=0.01)
me.vec <- beta.mod[2] + beta.mod[4]*mag
me.se <- sqrt( vcv.mod[2,2] + (mag^2)*vcv.mod[4,4] + 2*(mag)*(vcv.mod[2,4]) )

ci.hi <- me.vec + 1.697 * me.se
ci.lo <- me.vec - 1.697 * me.se

plot(me.vec ~ mag, type="l", ylim = c(-4, 6))
lines(ci.hi ~ mag, lty=2)
lines(ci.lo ~ mag, lty=2)

fdrInteraction(me.vec, me.se, df=lin.mod$df, level=0.90)                 # 4.233986

ci.hi <- me.vec + 4.233986 * me.se
ci.lo <- me.vec - 4.233986 * me.se
```

```
lines(ci.hi ~ mag, lty=2, lwd=2)
lines(ci.lo ~ mag, lty=2, lwd=2)

abline(h=0, lty=1, col="gray")
legend("topleft", lwd=c(1,2), lty=c(1,2), legend=c("90% CI", "90% FDR CI"))

## End(Not run)
```

`findMultiLims` *Determine Critical t-Statistic For Marginal Effects Plot*

Description

This function is defunct.

Usage

```
findMultiLims(...)
```

Arguments

`...`	Any argument to the function (ignored).

References

Esarey, Justin, and Jane Lawrence Sumner. 2018. "Corrigendum to 'Marginal Effects in Interaction Models: Determining and Controlling the False Positive Rate.'"

`legfig` *Replication data for Clark and Golder (2006)*

Description

District magnitude and ethnic heterogeneity data from a pooled sample of established democracies in the 1990s. Data originally from Clark and Golder (2006).

Format

A data frame with 754 rows and 33 variables:

country country name

countrynumber country number

year year of observation

enep1 electoral parties

eneg ethnic heterogeneity

logmag district magnitude

legelec legislative election

preselec presidential election

regime regime as of 31 Dec of given year (0=democracy, 1=dictatorship)

regime_leg regime type at time of leg. election (0=democracy, 1=dictatorship)

eighties election in 1980s closest to 1985

nineties election in 1990s closest to 1995

old elections in countries that did not transition to democracy in 1990s

avemag average district magnitude

districts number of electoral districts

enep effective number of ethnic groups fearon

enep_others n/a

enpp parliamentary parties - uncorrected

enpp_others n/a

enpp1 parliamentary parties - corrected

enpres effective number of presidential candidates

medmag median district magnitude

newdem first election of new democracy

proximity1 proximity - continuous

proximity2 proximity - dichotomous

seats assembly size

upperseats number of upper tier seats

uppertier percentage of uppertier seats

uppertier_eneg uppertier*eneg

logmag_eneg logmag*eneg

proximity1_enpres proximity1*enpres

twoelections n/a

twoelections1 n/a ...

Source

Clark, William R., and Matt Golder. 2006. "Rehabilitating Duverger's Theory." *Comparative Political Studies* 39(6): 679-708.

Index

bootFun, 2

fdrInteraction, 2
findMultiLims, 4

legfig, 4