Package 'nopp'

July 22, 2025

Type Package

Title Nash Optimal Party Positions

Version 1.1.2

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Description Estimation of party/candidate ideological positions
  that correspond to a Nash equilibrium along a
  one-dimensional space.

License GPL (>= 2)

Depends R (>= 2.10), mlogit, MASS

NeedsCompilation no

Repository CRAN

Date/Publication 2022-08-08 18:30:02 UTC

Contents

nopp-package	*Nash Optimal Party Positions*

Description

Estimation of party/candidate ideological positions that correspond to a Nash equilibrium along a one-dimensional space

Details

Package:	nopp
Type:	Package
Version:	1.0
Date:	2012-06-26
License:	GPL (>= 2)

`nopp` is a package for R which enables to compute party/candidate ideological positions that correspond to a Nash Equilibrium along a one-dimensional space. It accommodates alternative motivations in (each) party strategy while allowing to estimate the uncertainty around their optimal positions through two different procedures (bootstrap and MC).

Author(s)

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References

Adams, James F., Samuel Merrill III, and Bernard Grofman (2005). A Unified Theory of Party Competition. Cambridge: Cambridge University Press

Merrill, Samuel III, and James Adams (2001), Computing Nash Equilibria in Probabilistic, Multi-party Spatial Models with Nonpolicy Components, Political Analysis, 9, 347–61

Curini, L., and Iacus, S.M. (2017) Nash Optimal Party Positions: The nopp R Package, Journal of Statistical Software, 81(11), 1–25

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equilibrium	*Nash Optimal Party Positions*

Description

Nash Optimal Party Positions

Usage

```
equilibrium(start, model, data, tolerance = 1e-05, max.iter = 100,
coal = 0, alpha = 0, margin = NULL, fixed = NULL, gamma = 0,
boot = 0, MC = 0, self.var = "self", prox.var="prox",
position=NULL, votes=NULL, quadratic=TRUE, conf.level = 0.95)
```

Arguments

start	initial party positions. Numerical vector. Optional.
model	the `mlogit` model analysis
data	the data set
tolerance	tolerance in the convergence of Nash equilibrium. Default `1e-5`
max.iter	max iteration to convergence in Nash equilibrium. Default `100`
coal	a `list` specifying electoral coalitions. See Details.
alpha	the weight of coalition vote-share in party utility function. Default = 0. See Details.
margin	a `list` specifing the vote share margin to be maximized of a party/coalition against other party/coalition. See Details.
fixed	a `list` of fixed party positions. See Details.
gamma	the weight among nash and fixed arty position. Default=0. See Details.
boot	number of boostrap replications. See Details.
MC	number of Monte Carlo replications. See Details.
self.var	`character`: name of self-placement of respondent. See Details.
prox.var	`character`: name of party-placement variable. See Details.
position	a named `list`: of perceived position of parties. See Details.
votes	a named `list`: of actual vote share at election. See Details.
quadratic	a logical value: if `FALSE` the linear utility function is used to calculate the proximity. See Details.
conf.level	significant level for empirical Monte Carlo or bootstrap confidence intervals.

Details

See vignette.

Value

an object of class `nash.eq`

Note

See the vignette for detailed explanations and other working examples.

Author(s)

Luigi Curini, Stefano M. Iacus

References

Adams, James F., Samuel Merrill III, and Bernard Grofman (2005). A Unified Theory of Party Competition. Cambridge: Cambridge University Press

Merrill, Samuel III, and James Adams (2001), Computing Nash Equilibria in Probabilistic, Multi-party Spatial Models with Nonpolicy Components, Political Analysis, 9, 347–61

Curini, L., and Iacus, S.M. (2017) Nash Optimal Party Positions: The nopp R Package, Journal of Statistical Software, 81(11), 1–25

See Also

See Also as `plot.nash.eq`

Examples

```
## Not run:
data(italy2006)

str(italy2006)
italy2006[1:2,1:14]

election <- set.data(italy2006 , shape="wide", choice="vote",
varying=c(5:14), sep="_")
str(election)

m <- mlogit(vote~prox+partyID | gov_perf+sex+age+education,
election, reflevel = "UL")
summary(m)

true.pos <- list(FI=7.59, UL=3.50, RC=1.95, AN=8.08, UDC=5.66)
true.votes <- list(FI=.24, UL=.40, RC=.10, AN=.18, UDC=.08)
# model 1: comparison against true votes and party positions
nash.eq <- equilibrium(model=m, data=election, pos=true.pos,
 votes=true.votes)
nash.eq

par(mfrow=c(3,1))
plot(nash.eq)
par(mfrow=c(1,1))
```

```
# model 2: colation behaviours
coal1 <- list(FI=1, UL=2, RC=2, AN=1, UDC=1)
alpha1 <- list(FI=0.5, UL=0.5, RC=0.5, AN=0.5, UDC=0.5)
nash.eq <- equilibrium(model=m, data=election, coal=coal1,
 alpha=alpha1)
nash.eq

# model 3: colation behaviours
coal1 <- list(FI=1, UL=2, RC=2, AN=1, UDC=1)
alpha1 <- list(FI=0.7, UL=0.8, RC=0.1, AN=0.5, UDC=0.9)
nash.eq <- equilibrium(model=m, data=election, coal=coal1,
 alpha=alpha1)
nash.eq

# model 4: rivals tends to separate each other
nash.eq <- equilibrium(model=m, data=election, margin=list(FI="UL", UL="FI"))
nash.eq

# model 5: fixed position averaged with Nash equilibrium solution
nash.eq <- equilibrium(model=m, data=election, fixed=list(RC=1), gamma=0.2)
nash.eq

# model 6: rivals tends to separate each other with
# fixed position averaged with Nash equilibrium solution
nash.eq <- equilibrium(model=m, data=election,
margin=list(FI="UL", UL="FI"), fixed=list(RC=1), gamma=0.2)
nash.eq

# model 7: coalition and fixed position averaged with
# Nash equilibrium solution
coal1 <- list(FI=1, UL=2, RC=2, AN=1, UDC=1)
alpha1 <- list(FI=0.7, UL=0.8, RC=0.5, AN=0.5, UDC=0.5)
nash.eq <- equilibrium(model=m, data=election,  coal=coal1,
 alpha=alpha1, fixed=list(RC=1), gamma=0.2)
nash.eq

# model 8: Bootstrap analysis
set.seed(280715)
nash.eq <- equilibrium(model=m, data=election, boot=10)
nash.eq

# model 9: Monte Carlo simulation
set.seed(280715)
nash.eq <- equilibrium(model=m, data=election, MC=10)
nash.eq

## End(Not run)
```

---

italy2006   *2006 Italian General Election survey*

Description

2006 Italian General Election survey, with quadratic ideological proximity.

Usage

```
data(italy2006)
```

Format

A data frame with 438 observations on the following 18 variables.

country country name

id id of respondent

vote a factor with levels FI UL AN UDC RC for each party voted

self self-placement of respondent on a 0 to 10 left-right scale

prox_FI see Details.

prox_UL see Details.

prox_AN see Details.

prox_UDC see Details.

prox_RC see Details.

partyID_FI see Details.

partyID_UL see Details.

partyID_AN see Details.

partyID_UDC see Details.

partyID_RC see Details.

sex gender variable 1 = female

age see Details.

education see Details.

gov_perf see Details.

Details

In this survey respondents were asked to indicate which party they voted for in the 2006 Election. The data concerns 5 parties: UL (Ulivo), RC (Communist Refoundation party), FI (Forza Italia), AN (National Alliance) and UDC (Union of Christian Democrats).

prox_* quadratic ideological distance between the respondent and a party * placement

partyID_* binary variable equals to 1 if the respondent declares to feel herself close to party *

age : 1 = "18-24 years", 2 = "25-34", 3 = "35-44", 4 = "45-54", 5 = "55-64", 6 = "65 +"

education : 0 = "up to primary school", 1 = "incomplete secondary", 2 = "secondary completed", 3 = "post-secondary trade", 4 = "university undergraduate degree inc", 5 = "university undergraduate degree comp"

gov_perf : 1 = "very good job", 2 = "good job", 3 = "bad job", 4 = "very bad job"

Source

CSES - Comparative Study of Electoral Systems: <https://cses.org/>).

Examples

```
data(italy2006)
head(italy2006)
```

---

italy2006.lin   *2006 Italian General Election survey*

Description

2006 Italian General Election survey, with linear ideological proximity.

Usage

```
data(italy2006.lin)
```

Format

A data frame with 438 observations on the following 18 variables.

country country name

id id of respondent

vote a factor with levels FI UL AN UDC RC for each party voted

self self-placement of respondent on a 0 to 10 left-right scale

proxlin_FI see Details.

proxlin_UL see Details.

proxlin_AN see Details.

proxlin_UDC see Details.

proxlin_RC see Details.

partyID_FI see Details.

partyID_UL see Details.

partyID_AN see Details.

partyID_UDC see Details.

partyID_RC see Details.

sex gender variable 1 = female

age see Details.

education see Details.

gov_perf see Details.

Details

In this survey respondents were asked to indicate which party they voted for in the 2006 Election. The data concerns 5 parties: UL (Ulivo), RC (Communist Refoundation party), FI (Forza Italia), AN (National Alliance) and UDC (Union of Christian Democrats).

prox_* linear ideological distance between the respondent and a party * placement

partyID_* binary variable equals to 1 if the respondent declares to feel herself close to party *

age : 1 = "18-24 years", 2 = "25-34", 3 = "35-44", 4 = "45-54", 5 = "55-64", 6 = "65 +"

education : 0 = "up to primary school", 1 = "incomplete secondary", 2 = "secondary completed", 3 = "post-secondary trade", 4 = "university undergraduate degree inc", 5 = "university undergraduate degree comp"

gov_perf : 1 = "very good job", 2 = "good job", 3 = "bad job", 4 = "very bad job"

Source

CSES - Comparative Study of Electoral Systems: <https://cses.org/>).

Examples

```
data(italy2006.lin)
head(italy2006.lin)
## maybe str(italy2006.lin) ; plot(italy2006.lin) ...
```

---

italy2006.wide   *2006 Italian General Election survey*

Description

2006 Italian General Election survey - wide format

Usage

```
data(italy2006.wide)
```

Format

A data frame with 524 observations on the following 15 variables.

country country name

id id of respondent

vote a factor with levels FI UL AN UDC RC for each party voted

self self-placement of respondent on a 0 to 10 left-right scale

FI see Details.

DS see Details.

AN see Details.

`DL` see Details.

`UDC` see Details.

`RC` see Details.

`pID` see Details.

`sex` gender variable 1 = female

`age` see Details.

`education` see Details.

`gov_perf` see Details.

Details

In this survey respondents were asked to indicate which party they voted for in the 2006 Election. The data concerns 5 parties: UL (Ulivo), RC (Communist Refoundation party), FI (Forza Italia), AN (National Alliance) and UDC (Union of Christian Democrats). The dataset is in wide format.

variable from `FI` to `RC` identify the placement of those parties, on a 0 to 10 left-right scale, as perceived by the respondent.

`pID` is a variable that identifies the partisanship of the respondent (where 0=stands for no partyID, 1 = FI partyID, 23 = UL partyID, 3 = AN partyID, 4 = UDC partyID, 6 = RC partyID)

`age` : 1 = "18-24 years", 2 = "25-34", 3 = "35-44", 4 = "45-54", 5 = "55-64", 6 = "65 +"

`education` : 0 = "up to primary school", 1 = "incomplete secondary", 2 = "secondary completed", 3 = "post-secondary trade", 4 = "university undergraduate degree inc", 5 = "university undergraduate degree comp"

`gov_perf` : 1 = "very good job", 2 = "good job", 3 = "bad job", 4 = "very bad job"

Source

CSES - Comparative Study of Electoral Systems: <https://cses.org/>).

Examples

```
data(italy2006.wide)
head(italy2006.wide)
## maybe str(italy2006.wide) ; plot(italy2006.wide) ...
```

---

noppNews   *Show the NEWS file*

Description

Show the NEWS file of the nopp package.

Usage

```
noppNews()
```

Value

None.

---

plot.nash.eq   *Plot function for Nash equilibrium object*

Description

Plot function for Nash equilibrium object

Usage

```
## S3 method for class 'nash.eq'
plot(x,...)
```

Arguments

x   a nash.eq object

...   additional arguments passed to the inner plot function

Details

See vignette.

Author(s)

Luigi Curini, Stefano M. Iacus

References

Curini, L., and Iacus, S.M. (2017) Nash Optimal Party Positions: The nopp R Package, Journal of Statistical Software, 81(11), 1–25

See Also

See Also as [equilibrium](#)

Examples

```
## Not run:
data(italy2006)
election <- set.data(italy2006 , shape="wide", choice="vote", varying=c(5:14), sep="_")
m <- mlogit(vote~prox+partyID | gov_perf+sex+age+education, election, reflevel = "UL")

true.pos <- list(FI=7.59, UL=3.50, RC=1.95, AN=8.08, UDC=5.66)
true.votes <- list(FI=.24, UL=.40, RC=.10, AN=.18, UDC=.08)

# comparison against true votes and party positions
```

```
nash.eq <- equilibrium(model=m, data=election, pos=true.pos, votes=true.votes)
nash.eq
par(mfrow=c(3,1))
plot(nash.eq)


# bootstrap confidence intervals
nash.eq <- equilibrium(model=m, data=election, boot=10)
nash.eq
plot(nash.eq)

par(mfrow=c(1,1))

## End(Not run)
```

---

set.data   *Prepares data for Nash equilibrium*

Description

Prepares data for Nash equilibrium

Usage

```
set.data(data, shape="wide", choice, varying, sep="_")
```

Arguments

data	the data set
shape	either wide or long. Default wide. See Details.
choice	the variable indicating the choice made: it can be either a logical vector, a numerical vector with 0 where the alternative is not chosen, a factor with level 'yes' when the alternative is chosen.
varying	the indexes of the variables that are alternative specific. See Details.
sep	the seperator of the variable name and the alternative name (only relevant for a wide data.frame). See Details.

Details

For general examples see the vignette. The arguments shape, choice, varying and sep as as in the [mlogit.data](#) function.

Value

A `mlogit.data` object, which is a `data.frame` in long format, i.e. one line for each alternative. It has a index attribute, which is a data.frame that contains the index of the choice made ('chid'), the index of the alternative ('alt') and, if any, the index of the individual ('id'). The choice variable is a boolean which indicates the choice made. This function use reshape if the data.frame is in wide format. It also has the attribute `call` for further data manipulation in the bootstrap task of equilibrium.

Note

See the vignette for detailed explanations and other working examples.

Author(s)

Luigi Curini, Stefano M. Iacus

References

Curini, L., and Iacus, S.M. (2017) Nash Optimal Party Positions: The nopp R Package, Journal of Statistical Software, 81(11), 1–25

Examples

```
## Not run:
data(italy2006)

str(italy2006)
italy2006[1:2,1:14]

election <- set.data(italy2006 , shape="wide", choice="vote",
varying=c(5:14), sep="_")
str(election)

m <- mlogit(vote~prox+partyID | gov_perf+sex+age+education,
election, reflevel = "UL")
summary(m)

true.pos <- list(FI=7.59, UL=3.50, RC=1.95, AN=8.08, UDC=5.66)
true.votes <- list(FI=.24, UL=.40, RC=.10, AN=.18, UDC=.08)
# model: comparison against true votes and party positions
nash.eq <- equilibrium(model=m, data=election, pos=true.pos,
 votes=true.votes)
nash.eq

## End(Not run)
```

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