Description

Multinomial First Differences Predictions For Two Values (Observed Value Approach)

Usage

```r
mnl_fd2_ova(
  model, data, xvari, value1, value2,
  nsim = 1000, seed = "random",
  probs = c(0.025, 0.975)
)
```

Arguments

- `model`: the multinomial model, from a `multinom()`-function call (see the `nnet` package)
- `data`: the data with which the model was estimated
- `xvari`: the name of the variable that should be varied
- `value1`: first value for the difference
- `value2`: second value for the difference
- `nsim`: numbers of simulations
- `seed`: set a seed for replication purposes.
- `probs`: a vector with two numbers, defining the significance levels. Default to 5% significance level: `c(0.025, 0.975)`

Value

The function returns a list with several elements. Most importantly the list includes the simulated draws ‘S’, the simulated predictions ‘P’, the first differences of the predictions ‘P_fd’, a data set for plotting ‘plotdata’ the predicted probabilities, and one for the first differences ‘plotdata_fd’.

Examples

```r
library(nnet)
library(MASS)

dataset <- data.frame(y = c(rep("a", 10), rep("b", 10), rep("c", 10)),
  x1 = rnorm(30),
```
mnl_fd_ova

\[ x2 = \text{rnorm}(30, \text{mean} = 1), \]
\[ x3 = \text{sample}(1:10, 30, \text{replace} = \text{TRUE}) \]

mod <- multinom(y ~ x1 + x2 + x3, data = dataset, Hess = TRUE)

fd1 <- mnl_fd2_ova(model = mod, data = dataset,
                   xvari = "x1",
                   value1 = min(dataset$x1), value2 = max(dataset$x1))

library(foreign)
library(nnet)
library(MASS)

ml <- read.dta("https://stats.idre.ucla.edu/stat/data/hsbdemo.dta")

ml$prog2 <- relevel(ml$prog, ref = "academic")
ml$female2 <- as.numeric(ml$female == "female")

mod1 <- multinom(prog2 ~ female2 + read + write + math + science,
                 Hess = TRUE, data = ml)

fd1 <- mnl_fd2_ova(model = mod1, data = ml,
                   xvari = "math",
                   value1 = min(ml$math), value2 = max(ml$math),
                   nsim = 1000)

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mnl_fd_ova

Multinomial First Differences Prediction (Observed Value Approach)

Description

This function predicts values for two different scenarios over a range of values. It then takes the differences between the different simulations to return first differences for each value.

Usage

```r
mnl_fd_ova(
  model,
  data,
  xvari,
  scenname,
  scenvalues,
  by = NULL,
  nsim = 1000,
  seed = "random",
  probs = c(0.025, 0.975)
)
```
**Arguments**

- `model`: the multinomial model, from a `multinom()`-function call (see the `nnet` package).
- `data`: the data with which the model was estimated.
- `xvari`: the name of the variable that should be varied (the x-axis variable in prediction plots).
- `scenname`: if you want to hold a specific variable stable over all scenarios, you can name it here (optional).
- `scenvalues`: determine the two values at which value you want to fix the scenario (`scenname`). The first differences will be computed by subtracting the values of the first supplied scenario from the second one.
- `by`: define the steps of the `xvari`.
- `nsim`: numbers of simulations.
- `seed`: set a seed for replication purposes.
- `probs`: a vector with two numbers, defining the significance levels. Default to 5% significance level: `c(0.025, 0.975)`.

**Details**

The function uses the `mnl_pred_ova` function for each scenario. The results of these predictions are also returned and can therefore be easily accessed. If you need predictions for multiple scenarios, you can use this function to both plot the predictions for each scenario and the differences between them.

**Value**

The function returns a list with several elements. Most importantly the list includes the simulated draws ‘S’, the simulated predictions ‘P’, and a data set for plotting ‘plotdata’.

**Examples**

```r
library(nnet)
library(MASS)

dataset <- data.frame(y = c(rep("a", 10), rep("b", 10), rep("c", 10)),
                      x1 = rnorm(30),
                      x2 = rnorm(30, mean = 1),
                      x3 = sample(1:10, 30, replace = TRUE))

mod <- multinom(y ~ x1 + x2 + x3, data = dataset, Hess = TRUE)

fdif <- mnl_fd_ova(model = mod, data = dataset,
                   xvari = "x1", scenname = "x3",
                   scenvalues = c(min(dataset$x3), max(dataset$x3)))
```

```r
library(foreign)
library(nnet)
library(MASS)
```
ml <- read.dta("https://stats.idre.ucla.edu/stat/data/hsbdemo.dta")

ml$prog2 <- relevel(ml$prog, ref = "academic")
ml$female2 <- as.numeric(ml$female == "female")

mod1 <- multinom(prog2 ~ female2 + read + write + math + science,
                 Hess = TRUE, data = ml)

fdif <- mnl_fd_ova(model = mod1, data = ml, xvari = "math", by = 1,
                   scenname = "female2", scenvalues = c(0,1),
                   nsim = 1000)

mnl_pred_ova

Multinomial Prediction Function (Observed Value Approach)

Description

This function predicts probabilities for all choices of a multinomial logit model over a specified span of values.

Usage

mnl_pred_ova(
  model, data, xvari, by = NULL, scenname = NULL, scenvalue = NULL,
  nsim = 1000, seed = "random", probs = c(0.025, 0.975)
)

Arguments

model the multinomial model, from a multinom()-function call (see the nnet package)
data the data with which the model was estimated
xvari the name of the variable that should be varied (the x-axis variable in prediction plots)
by define the steps of the xvari.
scenname if you want to hold a specific variable stable over all scenarios, you can name it here (optional).
scenvalue determine at which value you want to fix the scenname.
**nsim**
numbers of simulations

**seed**
set a seed for replication purposes.

**probs**
a vector with two numbers, defining the significance levels. Default to 5% significance level: c(0.025, 0.975)

**Value**
The function returns a list with several elements. Most importantly the list includes the simulated draws ‘S’, the simulated predictions ‘P’, and a data set for plotting ‘plotdata’.

**Examples**
```r
library(nnet)
library(MASS)

dataset <- data.frame(y = c(rep("a", 10), rep("b", 10), rep("c", 10)),
                      x1 = rnorm(30),
                      x2 = rnorm(30, mean = 1),
                      x3 = sample(1:10, 30, replace = TRUE))

mod <- multinom(y ~ x1 + x2 + x3, data = dataset, Hess = TRUE)

pred <- mnl_pred_ova(model = mod, data = dataset,
                      xvari = "x1",
                      nsim = 100)
```

```r
library(foreign)
library(nnet)
library(MASS)

ml <- read.dta("https://stats.idre.ucla.edu/stat/data/hsbdemo.dta")

ml$prog2 <- relevel(ml$prog, ref = "academic")
ml$female2 <- as.numeric(ml$female == "female")

mod1 <- multinom(prog2 ~ female2 + read + write + math + science,
                 Hess = TRUE, data = ml)

pred <- mnl_pred_ova(model = mod1, data = ml,
                      xvari = "math", by = 1,
                      nsim = 1000)
```
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