Package ‘svyVGAM’

March 5, 2021

Title Design-Based Inference in Vector Generalised Linear Models
Version 1.0
Author Thomas Lumley
Description Provides inference based on the survey package for the wide range of parametric models in the ‘VGAM’ package.
Imports stats, methods
Depends VGAM, survey, R (>= 3.5.0)
Suggests pscl, knitr, markdown, rmarkdown
VignetteBuilder knitr
Encoding UTF-8
License GPL-3
Maintainer Thomas Lumley <t.lumley@auckland.ac.nz>
NeedsCompilation no
Repository CRAN
Date/Publication 2021-03-05 06:10:03 UTC

R topics documented:

nhanes_sxq ................................................................. 1
svy_vglm ................................................................. 2

Index

nhanes_sxq Data from NHANES: number of sex partners

Description

These data are from the NHANES 2003-2004 survey in the US. They provide an example of overdispersed count data that motivates a two-component zero-inflation model.
Usage

data("nhanes_sxq")

Format

A data frame with 2992 observations on the following 7 variables.

SDMVPSU  Primary Sampling Unit
SDMVSTR  stratum
WTINT2YR  weights
malepartners  lifetime number of male sexual partners
RIDAGEYR  age in years
DMDEDUC  level of education: 1=less than high school, 2=high school, 3-more than high school, 7=refused
RIDRETH1  Race/ethnicity: 1=Mexican American, 2=Other Hispanic, 4=non-Hispanic White, 5=non-Hispanic Black, 5=Other

Source

NHANES files demo_c.xpt and sxq_c.xpt

See Also

Construction of the data set is described by https://notstatschat.rbind.io/2015/05/26/zero-inflated-poisson-from-complex-samples/

Examples

data(nhanes_sxq)
nhdes = svydesign(id=~SDMVPSU,strat=~SDMVSTR,weights=~WTINT2YR, nest=TRUE, data=nhanes_sxq)
svy_vglm(malepartners~RIDAGEYR+factor(RIDRETH1)+DMDEDUC, zipoisson(), design=nhdes, crit = "coef")

svy_vglm

Design-based inference for vector generalised linear models

Description

This function provides design-based (survey) inference for Thomas Yee’s vector generalised linear models. It works by calling vglm with sampling weights, and then either using resampling (replicate weights) or extracting the influence functions and using a Horvitz-Thompson-type sandwich estimator.

Usage

svy_vglm(formula, family, design, ...)
svy_vglm

Arguments

- `formula`: Model formula, as for `vglm`
- `family`: Model family, as for `vglm`
- `design`: Survey design object
- `...`: Other arguments to pass to `vglm`

Value

An S3 object of class `svy_glm` with `print`, `coef` and `vcov` methods, containing the design in the `design` component and a fitted `vglm` object in the `fit` component.

See Also

- `nhanes_sxq`
- `vglm`
- `svydesign` `svrepdesign`

Examples

```r
data(api)
dclus2<-svydesign(id=~dnum+snum, fpc=~fpc1+fpc2, data=apiclus2)

## Ordinary Gaussian regression
m1<-svyglm(api00~api99+mobility+ell, design=dclus2,family=gaussian)
m2<-svy_vglm(api00~api99+mobility+ell, design=dclus2,family=uninormal())
m1
m2
SE(m1)
SE(m2)

summary(m1)
summary(m2)

## Proportional odds model
dclus2<-update(dclus2, mealcat=as.ordered(cut(meals,c(0,25,50,75,100))))
a<-svyolr(mealcat~avg.ed+mobility+stype, design=dclus2)
b<-svy_vglm(mealcat~avg.ed+mobility+stype, design=dclus2, family=propodds())
a
b
SE(a)
SE(b) #not identical, because svyolr() uses approximate Hessian

## Zero-inflated Poisson
data(nhanes_sxq)
hdes= svydesign(id=~SDMVPSU,strat=~SDMVSTRA,weights=~WTINT2YR,
                nest=TRUE, data=nhanes_sxq)

sv1<-svy_vglm(malepartners~RIDAGEYR+factor(RIDRETH1)+DMDEDUC,
              design=hdes)
```
svy_vglm()
sv1
summary(sv1)

## Multinomial
## Reference group (non-Hispanic White) average older and more educated
## so coefficients are negative
mult_eth <- svy_vglm(RIDRETH1 ~ RIDAGEYR + DMDEDUC,
    family = multinomial(reflevel = 3), design = nhdes)

## separate logistic regressions are close but not identical
two_eth <- svyglm(I(RIDRETH1 == 1) ~ RIDAGEYR + DMDEDUC,
    family = quasibinomial,
    design = subset(nhdes, RIDRETH1 %in% c(1, 3)))

summary(mult_eth)
summary(two_eth)
Index

* datasets
  nhanes_sxq, 1

* survey
  svy_vglm, 2

nhanes_sxq, 1, 3

svrepdesign, 3
svy_vglm, 2
svydesign, 3

vglm, 3