Package 'svyVGAM'

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Title Design-Based Inference in Vector Generalised Linear Models

Version 1.3

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

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NeedsCompilation no

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`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

`SDMVSTRA` 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-fr

Examples

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

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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, ...)
```

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, vcov, and predict 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

```
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)
## same model, but with the variance as a second parameter
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)
nhdes = svydesign(id=~SDMVPSU,strat=~SDMVSTRA,weights=~WTINT2YR,
       nest=TRUE, data=nhanes_sxq)

sv1<-svy_vglm(malepartners~RIDAGEYR+factor(RIDRETH1)+DMDEDUC,
```

```
      zipoisson(), design=nhdes, crit = "coef")
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)
```

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