Package 'multinbmod'

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Title Regression analysis of overdispersed correlated count data

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Description This is a likelihood approach for the regression analysis of overdispersed correlated count data with cluster varying covariates. The approach fits a multivariate negative binomial model by maximum likelihood and provides robust estimates of the regression coefficients.

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NeedsCompilation no

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R topics documented:

`multinbmod-package` *Regression analysis of overdispersed correlated count data*

Description

This is a robust likelihood approach for the regression analyis of overdispersed correlated counts data with cluster varying covariates. The approach fits a multivariate negative binomial model by maximum likelihood and provides robust estimates of the regression coefficients.

Details

Package:	multinbmod
Type:	Package
Version:	1.0
Date:	2014-01-14
License:	GPL-2
LazyLoad:	yes

Use function multinbmod to fit a multivariate negative binomial model by maximum likelihood. Robust estimates of regression parameters are provided.

Author(s)

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References

Solis-Trapala, I.L. and Farewell, V.T. (2005) Regression analysis of overdispersed correlated count data with subject specific covariates. Statistics in Medicine, 24: 2557-2575.

Examples

```
id <- factor(rep(1:20, rep(5, 20)))
y <- rnbinom(100, mu = rexp(100,1)+rep(rexp(20,.3),rep(5,20)),size=2.5)
x<-rbinom(100,1,.5)
dat <- data.frame(y = y, x = x, id = id)
multinbmod(y~x,data=dat,id=id)
summary(multinbmod(y~x,data=dat,id=id))
```

`multinb.fit` *Multivariate negative binomial model with robust estimation of regression coefficients*

Description

This function is called by "multinbmod", but it can also be called directly

Usage

```
multinb.fit(y, x, offset=1, id, start.par, control=list())
```

Arguments

y	Response vector.
x	Design matrix of covariates.
offset	Optional vector of offset values.
id	Variable indicating which subjects are correlated.
start.par	Vector of starting values for the parameters in the linear predictor (defaults to zero) and the overdispersion parameter (default to 0.5).
control	A list of parameters that control the convergence criteria. See "nlminb" for details.

Value

The return values is a list with components:

`estimated regression coefficients`

se from model	Estimated standard errors of regression coefficients.
robust se	Robust estimate of standard errors of regression coefficients.
t-values	Robust t-values.

`covariance of beta estimates from model`
Estimated covariance of estimated regression parameters.

`robust covariance of beta estimates`
Robust estimate of covariance of estimated regression coefficients

estimated phi	ML estimate of overdisperision parameter.
se(phi)	Its standard error.

`-2 x log-likelihood`

converged?	Logical.
iterations	Number of iterations required for convergence.

Author(s)

Ivonne Solis-Trapala

References

Solis-Trapala, I.L. and Farewell, V.T. (2005) Regression analysis of overdispersed correlated count data with subject specific covariates. Statistics in Medicine, 24: 2557-2575.

See Also

multinbmod

Examples

```
id <- factor(rep(1:20, rep(5, 20)))
y <- rnbinom(100, mu = rexp(100,1)+rep(rexp(20,.3),rep(5,20)),size=2.5)
x<-rbinom(100,1,.5)
dat <- data.frame(y = y, x = x, id = id)
multinb.fit(y,cbind(1,x),id=id)
```

`multinbmod` *Regression analysis of overdispersed correlated count data*

Description

This function fits a multivariate negative binomial model by Maximum Likelihood and calculates robust standard errors of the regression coefficients.

Usage

```
multinbmod(formula, data, id, offset, start.coef = NULL, start.phi = NULL,control=list())
```

Arguments

`formula`	A symbolic description of the model to be fit.
`data`	An optional data frame containing the variables in the model. If not found in "data", the variables are taken from "environment(formula)", typically the environment from which "multinbfit" is called.
`id`	A vector which identifies correlated subjects. The length of "id" should be the same as the number of observations. Data are assumed to be sorted so that observations on a cluster are contiguous rows for all entities in the formula.
`offset`	Optional vector of offset values.
`start.coef`	Vector of starting values for the parameters in the linear predictor. Dafaults are set to zero.
`start.phi`	Overdispersion parameter. This value must be positive. Default is set to 0.5.
`control`	A list of parameters that control the convergence criteria. See "nlminb" for details.

Details

The marginal distribution of the j-th observation from a cluster i is assummed to be Negative Binomial with mean mu_{ij} and variance $mu_{ij} + phi * mu_{ij}^2$. The covariance of two observations is phi times the product of their means. The function provides robust estimates of the regression parameters.

Value

The return values is a list, an object of class "multinbfit". The componets are:

converged	Logical.
coefficients	Estimated regression coefficients.
model.coef.se	Their standard errors.
robust.coef.se	Robust estimates of standard errors.
robust.t.values	Robust t-values.
mle.phi	Estimated overdispersion parameter.
phi.se	Its standard error.
minus2.loglik	-2 x log-likelihood.
call	The function call.

Author(s)

Ivonne Solis-Trapala

References

Solis-Trapala, I.L. and Farewell, V.T. (2005) Regression analysis of overdispersed correlated count data with subject specific covariates. Statistics in Medicine, 24: 2557-2575.

Examples

```
id <- factor(rep(1:20, rep(5, 20)))
y <- rnbinom(100, mu = rexp(100,1)+rep(rexp(20,.3),rep(5,20)),size=2.5)
x<-rbinom(100,1,.5)
dat <- data.frame(y = y, x = x, id = id)
multinbmod(y~x,data=dat,id=id)
summary(multinbmod(y~x,data=dat,id=id,control=list(iter.max=100)))
```

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summary.multinbmod *Summary of a multinbmod object*

Description

It displays the output of multinbmod

Usage

```
## S3 method for class 'multinbmod'
summary(object,...)
```

Arguments

`object`	The multinbmod object.
`...`	Any other arguments

Value

A short summary of the object is printed

Author(s)

Ivonne Solis-Trapala

See Also

multinbmod

Examples

```
id <- factor(rep(1:20, rep(5, 20)))
y <- rnbinom(100, mu = rexp(100,1)+rep(rexp(20,.3),rep(5,20)),size=2.5)
x<-rbinom(100,1,.5)
dat <- data.frame(y = y, x = x, id = id)
summary(myfit<-multinbmod(y~x,data=dat,id=id,control=list(iter.max=100)))
```

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