Package ‘GenMarkov’

November 8, 2021

Type Package
Title Multivariate Markov Chains
Version 0.1.0
Maintainer Carolina Vasconcelos <cvasconcelos@novaims.unl.pt>

License GPL (>= 2)
Encoding UTF-8
Imports alabama (>= 2015.3-1), fastDummies (>= 1.6.3), Hmisc (>= 4.5-0), matrixcalc (>= 1.0-3), maxLik (>= 1.4-8), nnet (>= 7.3-16), stats (>= 4.1.0)

NeedsCompilation no

Author Carolina Vasconcelos [aut, cre],
Bruno Damasio [aut]

Repository CRAN
Date/Publication 2021-11-08 08:50:08 UTC

R topics documented:

- mmcx ................................................................. 2
- multi.mtd .......................................................... 3
- multi.mtd_probit ............................................... 4

Index 6
Non-homogeneous Multivariate Markov Chains

Description

Estimates Multivariate Markov Chains that depend on exogeneous variables. The model is based on the Mixture Transition Distribution model, and considers non-homogeneous Markov Chains, instead of homogeneous Markov Chains as in Raftery (1985).

Usage

\texttt{mmcx(y,x,initial)}

Arguments

\begin{itemize}
\item \textit{y} \hfill Matrix of categorical data sequences.
\item \textit{x} \hfill Matrix of covariates (exogeneous variables).
\item \textit{initial} \hfill Vector of initial values.
\end{itemize}

Value

The function returns a list with the parameter estimates, standard-errors, z-statistics, p-values and the value of the log-likelihood function, for each equation.

Author(s)

Carolina Vasconcelos and Bruno Damasio

References


See Also

Optimization is done through \texttt{auglag}.

Examples

\begin{verbatim}
set.seed(1234)
s1 <- sample(c(1,2), 500, replace=TRUE)
s2 <- sample(c(1,2), 500, replace=TRUE)
x <- rnorm(500)
mmcx(y = cbind(s1,s2), x = cbind(x), initial=c(1,1))
\end{verbatim}
Description


Usage

multi.mtd(y, deltaStop = 0.0001, is_constrained = TRUE, delta = 0.1)

Arguments

- **y**: Matrix of categorical data sequences.
- **deltaStop**: the delta below which the optimization phases of the parameters stop.
- **is_constrained**: flag indicating whether the function will consider the usual set of constraints (usual set: TRUE, new set of constraints: FALSE).
- **delta**: the amount of change to increase/decrease in the parameters for each iteration of the optimization algorithm.

Value

The function returns a list with the parameter estimates, standard-errors, z-statistics, p-values and the value of the log-likelihood function, for each equation.

Note


Author(s)

Carolina Vasconcelos and Bruno Damasio

References


Examples

```r
set.seed(1234)
s1 <- sample(c(1,2), 500, replace=TRUE)
s2 <- sample(c(1,2), 500, replace=TRUE)
multi.mtd(y = cbind(s1,s2))
```

Description

Estimation of Multivariate Markov Chains through the proposed model by Nicolau (2014). This model presents two attractive features: it is completely free of constraints, thereby facilitating the estimation procedure, and it is more precise at estimating the transition probabilities of a multivariate or higher-order Markov chain than the Raftery’s MTD model.

Usage

```r
multi.mtd_probit(y, initial, nummethod='bfgs')
```

Arguments

- `y` Matrix of categorical data sequences
- `initial` Vector of initial values
- `nummethod` Numerical maximisation method, currently either "NR" (for Newton-Raphson), "BFGS" (for Broyden-Fletcher-Goldfarb-Shanno), "BFGSR" (for the BFGS algorithm implemented in R), "BHHH" (for Berndt-Hall-Hall-Hausman), "SANN" (for Simulated ANNealing), "CG" (for Conjugate Gradients), or "NM" (for Nelder-Mead). Lower-case letters (such as "nr" for Newton-Raphson) are allowed. The default method is "BFGS". For more details see `maxLik`.

Value

The function returns a list with the parameter estimates, standard-errors, z-statistics, p-values and the value of the log-likelihood function, for each equation.

Author(s)

Carolina Vasconcelos and Bruno Damasio

References

Examples

```r
set.seed(1234)
s1 <- sample(c(1,2), 500, replace=TRUE)
s2 <- sample(c(1,2), 500, replace=TRUE)
multi.mtd_probit(y = cbind(s1,s2), initial=c(1,1,1), nummethod='bfgs')
```
Index

auglag, 2
maxLik, 4
mmcx, 2
multi.mtd, 3
multi.mtd_probit, 4