

Package ‘GibbsACOV’

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Type Package

Title Gibbs Sampler for One-Way Mixed-Effects ANOVA and ANCOVA Models

Version 1.1

Date 2013-05-05

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Description Gibbs sampler for one-way linear mixed-effects models
(ANOVA, ANCOVA) with homoscedasticity of errors and uniform priors.

License GPL (>= 2)

Depends MASS

Collate 'acovamcmc.R' 'plot.acovamcmc.R' 'print.acovamcmc.R' 'summary.acovamcmc.R'

NeedsCompilation no

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GibbsACOV-package	<i>Gibbs Sampler for One-Way Mixed-Effects ANOVA and ANCOVA Models</i>
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Description

Gibbs sampler for one-way linear mixed-effects models (ANOVA, ANCOVA) with homoscedasticity of errors and uniform priors.

Details

Package: GibbsACOV
 Type: Package
 Version: 1.1
 Date: 2013-05-05
 License: GPL (>= 2)

~~ An overview of how to use the package, including the most important functions ~~

Author(s)

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References

Gelman, A and Rubin, DB (1992) Inference from iterative simulation using multiple sequences, *Statistical Science*, 7, 457-511.

Examples

```
## Not run:
# ANCOVA with 2 continuous predictors and 5 factor levels
data(corn)
init1 <- c(rep(0,7), 1, 1)
init2 <- c(rnorm(7), rgamma(2,2,1))
init3 <- c(rnorm(7), rgamma(2,2,1))
init4 <- c(rnorm(7), rgamma(2,2,1))
initval <- rbind(init1, init2, init3, init4)
acovamcmc(corn$yield, corn$variety, cbind((corn$nitrogen)^2, corn$nitrogen), 4, 10000 , initval)

# ANOVA with grand mean parameterization and 12 factor levels
data(csection)
init1 <- c(rep(0,13), 1, 1)
init2 <- c(rnorm(13), rgamma(2,2,1))
init3 <- c(rnorm(13), rgamma(2,2,1))
```

```

init4 <- c(rnorm(13), rgamma(2,2,1))
initval <- rbind(init1, init2, init3, init4)
Y = log(csection$rate / (1-csection$rate))
acovamcmc(Y, factor(csection$hospital), matrix(1,length(csection$hospital),1), 4, 10000, initval)

## End(Not run)

```

acovamcmc	<i>Gibbs sampler for one-way mixed-effects ANOVA and ANCOVA models.</i>
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Description

Gibbs sampler for one-way mixed-effects ANOVA and ANCOVA models using flat priors.

Usage

```
acovamcmc(Y, trt, X, nochn, numIter, initval, credint = 0.95, Rthresh = 1.1)
```

Arguments

Y	Vector of reponses of n subjects
trt	Vector of categorical factor levels for n subjects
X	Design matrix with dimension (n x p) where p is the number of continuous predictors (for ANOVA, p = 1 to include grand mean)
nochn	Number of chains to test convergence of the Gibbs sampler
numIter	Number of iterations in the Gibbs sampler
initval	Matrix of initial values for Gibbs sampler with dimension (nochn, (p + nlevels(trt) + 2))
credint	Coverage probability for parameter credible intervals
Rthresh	Gelman-Rubin diagnostic for test of convergence

Value

S3 acovamcmc object; a list consisting of

beta	values of regression coefficients for each iteration
sig2a	values of mixed-effect variance for each iteration
sig2e	values of error variance for each iteration
Credible_Interval	lower bound, point estimate, and upper bound for parameters
Credible_Interval_Coverage	coverage percentage for credible intervals
Convergence_Diag	status of Gibbs sampler convergence using threshold set for Gelman and Rubin's diagnostic

Gelman_Rubin_Threshold threshold set for Gelman and Rubin's diagnostic

Iterations number of iterations of Gibbs sampler

Run_Time total elapsed seconds

References

Gelman, A and Rubin, DB (1992) Inference from iterative simulation using multiple sequences, *Statistical Science*, 7, 457-511.

Examples

```
## Not run:
# ANCOVA with 2 continuous predictors and 5 factor levels
data(corn)
init1 <- c(rep(0,7), 1, 1)
init2 <- c(rnorm(7), rgamma(2,2,1))
init3 <- c(rnorm(7), rgamma(2,2,1))
init4 <- c(rnorm(7), rgamma(2,2,1))
initval <- rbind(init1, init2, init3, init4)
acovamcmc(corn$yield, corn$variety, cbind((corn$nitrogen)^2, corn$nitrogen), 4, 10000, initval)
# ANOVA with grand mean parameterization and 12 factor levels
data(csection)
init1 <- c(rep(0,13), 1, 1)
init2 <- c(rnorm(13), rgamma(2,2,1))
init3 <- c(rnorm(13), rgamma(2,2,1))
init4 <- c(rnorm(13), rgamma(2,2,1))
initval <- rbind(init1, init2, init3, init4)
Y = log(csection$rate / (1-csection$rate))
acovamcmc(Y, factor(csection$hospital), matrix(1,length(csection$hospital),1), 4, 10000, initval)

## End(Not run)
```

corn

Example dataset: corn

Description

Example 1-way mixed-effects ANCOVA dataset for acovamcmc. Classic agricultural experiment: corn yield by variety and level of nitrogen fertilizer.

Usage

corn

Format

variety corn variety

nitrogen level of nitrogen fertilizer

yield corn yield

Examples

```
data(corn)
```

csection

Example dataset: C-section rates

Description

Example 1-way mixed-effects ANOVA dataset for acovamcmc. C-section rate for 10 randomly selected obstetricians at 12 randomly selected urban hospitals with at least 20 obstetricians associated with its maternity ward.

Usage

```
csection
```

Format

hospital one of 12 hospitals where C-section rate was recorded

rate rate of delivery of babies by C-section

Examples

```
data(csection)
```

<code>plot.acovamcmc</code>	<i>plot.acovamcmc</i>
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Description

Plots for a acovamcmc object

Usage

```
## S3 method for class 'acovamcmc'  
plot(x, ...)
```

Arguments

<code>x</code>	A acovamcmc object
<code>...</code>	Ignored

<code>print.acovamcmc</code>	<i>print.acovamcmc</i>
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Description

Print for a acovamcmc object

Usage

```
## S3 method for class 'acovamcmc'  
print(x, ...)
```

Arguments

<code>x</code>	A acovamcmc object
<code>...</code>	Ignored

summary.acovamcmc *summary.acovamcmc*

Description

Summary for a acovamcmc object

Usage

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

Arguments

object	A acovamcmc object
...	Ignored

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