Package 'Bayesiantreg'

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Type Package

Title Bayesian t Regression for Modeling Mean and Scale Parameters

License GPL (>= 2)

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Depends R (>= 4.1.0)

Imports MASS (>= 7.3), Matrix (>= 1.2), mvtnorm (>= 1.1)

Description Performs Bayesian t Regression where mean and scale parameters are modeling by lineal regression structures, and the degrees of freedom parameters are estimated.

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NeedsCompilation no

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`Bayesiantreg-package` *Function to do Bayesian t Regression: joint mean and variance modeling and estimation of the degrees of freedom*

Description

Bayesian t regression package

Details

Package:	Bayesiantreg
Type:	Package
Version:	1.0
Date:	2020-05-31
License:	GPL-2
LazyLoad:	yes

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

`Bayesiantreg` *Bayesiantreg*

Description

Function to do Bayesian t Regression: joint mean and variance modeling and estimation of the degrees of freedom

Usage

```
Bayesiantreg(y, x, z, nsim, bini, bpri, Bpri, gini, gpri,Gpri, glini, glpri,
           type, apriori, propuesta, Maxi=NULL,
           lambda = NULL, p = NULL, burn, jump, graph1 = TRUE, graph2 = TRUE,
           graph3 = TRUE)
```

Arguments

y	object of class matrix, with the dependent variable.
x	object of class matrix, with the variables for modelling the mean.
z	object of class matrix, with the variables for modelling the precision.
nsim	a number that indicate the number of iterations.
bini	a vector with the initial values of beta.
bpri	a vector with the values of the mean of the prior of beta.
Bpri	a matrix with the values of the variance of the prior of beta.
gini	a vector with the initial values of gamma.
gpri	a vector with the values of the mean of the prior of gamma.
Gpri	a matrix with the values of the variance of the prior of gamma.
glini	a vector with the initial value of the degrees of freedom.
glpri	a vector with the value of the the prior of the degrees of freedom.
type	a vector that can take the value "D" if the prior for the degrees of freedom considered as discrete or "C" if it is continuous.
apriori	when type is "D", it is a vector that can take the values of "poi" for a Poisson prior or "unif" for a uniform prior. When type is "C", it is a vector that can take the values of "exp" for the exponential prior, "unif" for the uniform prior or "J2" for the Jeffrey's prior.
propuesta	when type is "D", it is a vector that can take the values of "poi" for a Poisson proposal, "unif" for a uniform proposal or by default the proposal made by Marin and Cepeda (_). When type is "C", it is a vector that can take the values of "exp" for the exponential proposal, "unif" for the uniform proposal, "J2" for the Jeffrey's proposal or by default the proposal made by Marin and Cepeda (_).
Maxi	a number indicating the maximum value for the uniform prior an the uniforme proposal.
lambda	a number indicating the mean parameter value for the Poisson prior an the Poisson proposal.
p	a number indicating the parameter value for the Jeffrey's prior an the Jeffrey's proposal.
burn	a proportion that indicate the number of iterations to be burn at the beginning of the chain.
jump	a number that indicate the distance between samples of the autocorrelated the chain, to be excluded from the final chain.
graph1	if it is TRUE present the graph of the chains without jump and burn.

graph2	if it is TRUE present the graph of the chains with jump and burn.
graph3	if it is TRUE present the graph of the standardized residuals, the the standardized residuals against the lineal predictor, the pseudo deviance residuals and the pseudo deviance residuals against the lineal predictor.

Details

The bayesian t regression allows the joint modelling of mean and variance and the estimation of the degrees of freedom of a t distributed variable, as is proposed in Marin and Cepeda (_), with identical link for the mean and logarithmic for the variance, and differents discrete and continuous aproach for the degrees of freedom.

Value

object of class bayesbetareg with:

coefficients	object of class matrix with the estimated coefficients of beta, gamma and degrees of freedom.
interv	object of class matrix with the estimated confidence intervals of beta, gamma and the degrees of freedom.
fitted.values	object of class matrix with the fitted values of y.
residuals	object of class matrix with the residuals of the regression.
residualsstd	object of class matrix with the standardized residuals of the regression.
residualsdev	object of class matrix with the pseudo deviance residuals of the regression.
variance	object of class matrix with the variance terms of the regression.
beta.mcmc	object of class matrix with the complete chains for beta.
gamma.mcmc	object of class matrix with the complete chains for gamma.
gl.mcmc	object of class matrix with the complete chains for the degrees of freedom.
beta.mcmc.burn	object of class matrix with the chains for beta after the burned process.
gamma.mcmc.burn	object of class matrix with the chains for gamma after the burned process.
gl.mcmc.burn	object of class matrix with the chains for the degreees of freedom after the burned process.
loglik	the logaritmic of the liklihood of the model.
AIC	AIC of the model.
BIC	BIC of the model.
DIC	BIC of the model.
PseudoDeviance	Pseudo deviance criteria of the model as is proposed by Marin and Cepeda (_).
arb	acceptance percentage for beta.
arg	acceptance percentage for gamma.
argl	acceptance percentage for the degrees of freedom.
call	Call.

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

Examples

```
n <- 10
X1 <- runif(n,0,10)
X2 <- runif(n,5,10)
X3 <- runif(n,10,15)


y1 <- c(0.09, 1.68, -2.43, 0.23, 2.94, 1.50, 3.40, 2.22, 0.28, -0.17)

betas <- c(0,0,0,0)
gammas <- c(0,0,0)
gl <- 3

x <- cbind(rep(1,n),X1,X2,X3)
z <- cbind(rep(1,n),X2,X3)
y <- y1

Bpri <- diag(rep(100,4))
bpri <- rep(0,4)

Gpri <- diag(rep(10,3))
gpri <- rep(0,3)

glpri <- 7

propuesta <- "unif2"
apriori <- "unif"
tipo <- "D"

Maxi <- 100
nsim <- 50

bini=bpri
gini=gpri
glini=glpri
```

```
reg1 <- Bayesiantreg(y, x, z, nsim=nsim, bini, bpri,
                     Bpri, gini,
                     gpri,Gpri, glini, glpri,
                     type=tipo, apriori=apriori,
                     propuesta=propuesta,
                     Maxi=Maxi,burn=0.3, jump=3,
                    graph1 = TRUE, graph2 = TRUE, graph3 = TRUE)
```

BayesiantregEst *Bayesian t regression*

Description

Function to do Bayesian t Regression: joint mean and variance modeling and estimation of the degrees of freedom

Usage

```
BayesiantregEst(y, x, z, nsim, bini, bpri, Bpri, gini, gpri, Gpri, glini, glpri,
           type, apriori, propuesta, Maxi=NULL,
           lambda = NULL, p = NULL, burn, jump, graph1 = TRUE, graph2 = TRUE,
           graph3 = TRUE)
```

Arguments

y	object of class matrix, with the dependent variable.
x	object of class matrix, with the variables for modelling the mean.
z	object of class matrix, with the variables for modelling the precision.
nsim	a number that indicate the number of iterations.
bini	a vector with the initial values of beta.
bpri	a vector with the values of the mean of the prior of beta.
Bpri	a matrix with the values of the variance of the prior of beta.
gini	a vector with the initial values of gamma.
gpri	a vector with the values of the mean of the prior of gamma.
Gpri	a matrix with the values of the variance of the prior of gamma.
glini	a vector with the initial value of the degrees of freedom.
glpri	a vector with the value of the the prior of the degrees of freedom.
type	a vector that can take the value "D" if the prior for the degrees of freedom considered as discrete or "C" if it is continuous.
apriori	when type is "D", it is a vector that can take the values of "poi" for a Poisson prior or "unif" for a uniform prior. When type is "C", it is a vector that can take the values of "exp" for the exponential prior, "unif" for the uniform prior or "J2" for the Jeffrey's prior.

propuesta	when type is "D", it is a vector that can take the values of "poi" for a Poisson proposal, "unif" for a uniform proposal or by default the proposal made by Marin and Cepeda (_). When type is "C", it is a vector that can take the values of "exp" for the exponential proposal, "unif" for the uniform proposal, "J2" for the Jeffrey's proposal or by default the proposal made by Marin and Cepeda (_).
Maxi	a number indicating the maximum value for the uniform prior an the uniforme proposal.
lambda	a number indicating the mean parameter value for the Poisson prior an the Poisson proposal.
p	a number indicating the parameter value for the Jeffrey's prior an the Jeffrey's proposal.
burn	a proportion that indicate the number of iterations to be burn at the beginning of the chain.
jump	a number that indicate the distance between samples of the autocorrelated the chain, to be excluded from the final chain.
graph1	if it is TRUE present the graph of the chains without jump and burn.
graph2	if it is TRUE present the graph of the chains with jump and burn.
graph3	if it is TRUE present the graph of the standardized residuals, the the standardized residuals against the lineal predictor, the pseudo deviance residuals and the pseudo deviance residuals against the lineal predictor.

Details

The bayesian t regression allows the joint modelling of mean and variance and the estimation of the degrees of freedom of a t distributed variable, as is proposed in Marin and Cepeda (_), with identical link for the mean and logarithmic for the variance, and differents discrete and continuous aproach for the degrees of freedom.

Value

object of class bayesbetareg with:

coefficients	object of class matrix with the estimated coefficients of beta, gamma and degrees of freedom.
interv	object of class matrix with the estimated confidence intervals of beta, gamma and the degrees of freedom.
fitted.values	object of class matrix with the fitted values of y.
residuals	object of class matrix with the residuals of the regression.
residualsstd	object of class matrix with the standardized residuals of the regression.
residualsdev	object of class matrix with the pseudo deviance residuals of the regression.
variance	object of class matrix with the variance terms of the regression.
beta.mcmc	object of class matrix with the complete chains for beta.
gamma.mcmc	object of class matrix with the complete chains for gamma.
gl.mcmc	object of class matrix with the complete chains for the degrees of freedom.

beta.mcmc.burn	object of class matrix with the chains for beta after the burned process.
gamma.mcmc.burn	object of class matrix with the chains for gamma after the burned process.
gl.mcmc.burn	object of class matrix with the chains for the degreees of freedom after the burned process.
AIC	AIC of the model.
BIC	BIC of the model.
DIC	BIC of the model.
PseudoDeviance	a Pseudo Deviance criteria of the model as is proposed in Marin and Cepeda (_).

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

Examples

```
#library(heavy)
#data(ereturns)

#y <- ereturns[,3]
#x <- cbind(rep(1,nrow(ereturns)),ereturns[,4])
#z <- x

## A priori para Beta
#Bpri <- diag(rep(100,2))
#bpri <- rep(0,2)

## A priori para Gamma
#Gpri <- diag(rep(10,2))
#gpri <- rep(0,2)

##otros parametros
#glpri <- 7

#propuesta <- "unif2"
#apriori <- "unif"
#type <- "D"

#lambda <- 0.1
```

```
 #p <- 10
 #Maxi <- 100

 #nsim <- 100
 #burn <- 0.1
 #jump <- 2

 #bini=bpri
 #gini=gpri
 #glini=glpri

#reg1 <- Bayesiantreg(y, x, z, nsim, bini, bpri, Bpri, gini, gpri,Gpri, glini, glpri,
#           type, apriori, propuesta, Maxi=NULL,
#           lambda = NULL, p = NULL, burn, jump, graph1 = T, graph2 = T,
#           graph3 = T)
#summary(reg1)
```

`criteria` *criteria for comparison the bayesian t regression models*

Description

Performs the comparison criterias for the Bayesian t Regression

Usage

```
criteria(object,...)
```

Arguments

`object`	object of class "Bayesiantreg"
`...`	not used.

Details

This function allows to extract the information criteria from the model AIC, BIC, DIC and pseudo-deviance.

Value

`loglik`	the logaritmic of the liklihood of the model
`AIC`	the AiC criteria
`BIC`	the BIC criteria
`DIC`	the DIC criteria
`PseudoDeviance`	the pseudo deviance criteria of the model as is proposed in Marin and Cepeda (_).

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>,

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

`devero` *Loglikelihood for every point of the t model*

Description

Calculate the loglikelihood for every point of the t model

Usage

```
devero(y, mu, sigma2, grados)
```

Arguments

`y`	object of class matrix, with the dependent variables.
`mu`	object of class matrix, with the mean of the model.
`sigma2`	object of class matrix, with the variace of the model.
`grados`	a vector with the degrees of freedom of the model.

Details

Calculate the loglikelihood for the t model as proposed by Marin and Cepeda (_).

Value

`l`	a value with the loglikelihood for the t model

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

`dJ2` *density of the Jeffrey's distribution*

Description

calculates the density of the Jeffrey's distribution

Usage

```
dJ2(gl.ini, p)
```

Arguments

`gl.ini`	a vector with the number to evaluate in the density.
`p`	a number indicating the parameter value for the Jeffrey's prior an the Jeffrey's proposal

Details

Calculates the density of the Jeffrey's distribution

Value

`J1`	the value of the density

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

dpostb *Posterior value of beta*

Description

Calculate a value for posterior density for beta parameter

Usage

```
dpostb(y, x, z, betas, gammas, gl, bpri,Bpri)
```

Arguments

y	object of class matrix, with the dependen variables.
x	object of class matrix, with the variables for modelling the mean.
z	object of class matrix, with the variables for modelling the variance.
betas	a vector with the proposal beta parameters.
gammas	a vector with the proposal gamma parameters.
gl	a vector with the proposal degreees of freedom parameters.
bpri	a vector with the values of the mean of the prior of beta.
Bpri	a matrix with the values of the variance of the prior of beta.

Details

Generate the posterior density for the beta proposed by Marin and Cepeda (_).

Value

value	a value with the posterior denity for beta

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

dpostg *Posterior density of gamma*

Description

Propose a value for posterior density of the gamma parameter

Usage

```
dpostg(y, x, z, betas, gammas, gl, gpri, Gpri)
```

Arguments

y	object of class matrix, with the dependent variables.
x	object of class matrix, with the variables for modelling the mean.
z	object of class matrix, with the variables for modelling the variance.
betas	a vector with the proposal beta parameters.
gammas	a vector with the proposal gamma parameters.
gl	a vector with the proposal degrees of freedom parameter.
gpri	a vector with the values of the mean of the prior of gamma.
Gpri	a matrix with the values of the variance of the prior of gamma.

Details

Generate the posterior density for the gamma proposed by Marin and Cepeda (_).

Value

value	a value with the posterior denity for gamma

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

gammakernel *the probability of a gamma parameter from the probability density funcion defined by old parameters.*

Description

evaluate the probability of a gamma parameter from the probability density function defined by old parameters.

Usage

```
gammakernel(y, x, z, betas.ini, gammas.now, gammas.old, gl.ini, gpri, Gpri)
```

Arguments

y	object of class matrix, with the dependent variable
x	object of class matrix, with the variables for modelling the mean
z	object of class matrix, with the variables for modelling the variance
betas.ini	a vector with the beta parameters that define the old p.d.f
gammas.now	a vector with the gamma parameters - new parameters - to evaluate in the old p.d.f
gammas.old	a vector with the gamma parameters that define the old p.d.f
gl.ini	a vector with the degrees of freedom parameters that define the old p.d.f
gpri	a vector with the initial values of gamma
Gpri	a matrix with the initial values of the variance of gamma

Details

Evaluate the probability of a gamma parameter from the probability density function defined by old parameters, according with the model proposed by Marin and Cepeda-Cuervo (_).

Value

value	a vector with the probability for the gamma parameter from the probability density function defined by old parameters.

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

`gammaproposal` *A proposal for gamma parameters*

Description

Propose a value for the gamma parameters

Usage

```
gammaproposal(y, x, z, betas.ini, gammas.ini, gl.ini, gpri, Gpri)
```

Arguments

`y`	object of class matrix, with the dependent variable
`x`	object of class matrix, with the variables for modelling the mean
`z`	object of class matrix, with the variables for modelling the variance
`betas.ini`	a vector with the previous proposal beta parameters
`gammas.ini`	a vector with the previous proposal gamma parameters
`gl.ini`	a vector with the previous proposal degrees of freedom parameter
`gpri`	a vector with the values of the mean of the prior of gamma.
`Gpri`	a matrix with the values of the variance of the prior of gamma.

Details

Generate a proposal for the gamma parameters according to the model proposed by Marin and Cepeda-Cuervo (_).

Value

`gammas.pro`	a number with the proposal for the gamma parameters.

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

`glpost` *Posterior value of the degrees of freedom*

Description

Calculate a value for posterior density of the degrees of freedom parameter

Usage

```
glpost(y, x, z, betas.ini, gammas.ini, gl.ini, Maxi, lambda, p, prior, type)
```

Arguments

`y`	object of class matrix, with the dependent variables.
`x`	object of class matrix, with the variables for modelling the mean.
`z`	object of class matrix, with the variables for modelling the variance.
`betas.ini`	a vector with the proposal beta parameters.
`gammas.ini`	a vector with the proposal gamma parameters.
`gl.ini`	a vector with the proposal degrees of freedom parameter.
`Maxi`	a number indicating the maximum value for the uniform prior an the uniforme proposal
`lambda`	a number indicating the mean parameter value for the Poisson prior an the Poisson proposal
`p`	a number indicating the parameter value for the Jeffrey's prior an the Jeffrey's proposal
`type`	a vector that can take the value "D" if the prior for the degrees of freedom considered as discrete or "C" if it is continuous.
`prior`	when type is "D", it is a vector that can take the values of "poi" for a Poisson prior or "unif" for a uniform prior. When type is "C", it is a vector that can take the values of "exp" for the exponential prior, "unif" for the uniform prior or "J2" for the Jeffrey's prior.

Details

Generate the posterior density for the degrees of freedom proposed by Marin and Cepeda (_).

Value

value	a value with the posterior denity for the degrees of freedom

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

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glproposal *A proposal for degrees of freedom parameter*

Description

Propose a value for the degrees of freedom parameter

Usage

```
glproposal(gl.ini, lambda, p, Maxi, matriz, propuesta, type)
```

Arguments

gl.ini	a vector with the previous proposal degrees of freedom parameter
lambda	a number indicating the mean parameter value for the Poisson prior an the Poisson proposal.
p	a number indicating the parameter value for the Jeffrey's prior an the Jeffrey's proposal.
Maxi	a number indicating the maximum value for the uniform prior an the uniforme proposal.
matriz	a matrix generate by the function tabla of the bayesiantreg package.
propuesta	when type is "D", it is a vector that can take the values of "poi" for a Poisson proposal, "unif" for a uniform proposal or by default the proposal made by Marin and Cepeda (_). When type is "C", it is a vector that can take the values of "exp" for the exponential proposal, "unif" for the uniform proposal, "J2" for the Jeffrey's proposal or by default the proposal made by Marin and Cepeda (_).
type	a vector that can take the value "D" if the prior for the degrees of freedom considered as discrete or "C" if it is continuous.

Details

Generate a proposal for the gamma parameter according to the model proposed by Marin and Cepeda-Cuervo (_).

Value

gl.pro	a number with the proposal for the degrees of freedom parameter.

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

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mukernel *the probability of a beta parameter from the probability density funcion defined by old parameters*

Description

evaluate the probability of a beta parameter from the probability density function defined by old parameters

Usage

```
mukernel(y, x, z, betas.now, betas.old, gammas.ini, gl.ini, bpri, Bpri)
```

Arguments

y	object of class matrix, with the dependent variable
x	object of class matrix, with the variables for modelling the mean
z	object of class matrix, with the variables for modelling the variance
betas.now	a vector with the beta parameters - new parameters - to evaluate in the old p.d.f
betas.old	a vector with the beta parameters that define the old p.d.f
gammas.ini	a vector with the gammas parameters that define the old p.d.f
gl.ini	a vector with the degrees of freedom parameter that define the old p.d.f
bpri	a vector with the initial values of beta
Bpri	a matrix with the initial values of the variance of beta

Details

Evaluate the probability of a beta parameter from the probability density function defined by old parameters, according with the model proposed by Cepeda(2001) and Cepeda and Gamerman(2005).

Value

value	a matrix with the probability for the beta parameter from the probability density function defined by old parameters

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

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muproposal *A proposal for beta parameter*

Description

Propose a value for the beta parameter

Usage

```
muproposal(y, x, z, betas.ini, gammas.ini, gl.ini, bpri, Bpri)
```

Arguments

y	object of class matrix, with the dependent variable
x	object of class matrix, with the variables for modelling the mean
z	object of class matrix, with the variables for modelling the variance
betas.ini	a vector with the previous proposal beta parameters
gammas.ini	a vector with the previous proposal gamma parameters
gl.ini	a vector with the previous proposal degrees of freedom parameter
bpri	a vector with the values of the mean of the prior of beta.
Bpri	a matrix with the values of the variance of the prior of beta.

Details

Generate a proposal for the beta parameters according to the model proposed by Marin and Cepeda-Cuervo (_).

Value

betas.pro	a number with the proposal for the beta parameters.

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

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pJ2 *density of the Jeffrey's distribution*

Description

calculates the probability of the Jeffrey's distribution

Usage

```
pJ2(gl.ini, p)
```

Arguments

gl.ini	a vector with the number to evaluate in the density.
p	a number indicating the parameter value for the Jeffrey's prior an the Jeffrey's proposal

Details

Calculates the probability of the Jeffrey's distribution

Value

J1I	the value of the probability

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

`print.summary.Bayesiantreg` *print the summary of the Bayesian t regression*

Description

Print the summary BBayesian t Regression: joint mean and variance modeling and estimation of the degrees of freedom

Usage

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

Arguments

`x`	object of class Bayesiantreg
`...`	not used.

Value

Print the summary Bayesian t Regression: joint mean and variance modeling and estimation of the degrees of freedom

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

rJ2 *random number from the Jeffrey's distribution*

Description

generates random numbers from the Jeffrey's distribution

Usage

```
rJ2(n, matriz, min, max)
```

Arguments

n	a number that indicates the number of random values that will by generate from the Jeffrey's distribution.
matriz	a matrix generate by the function tabla of the bayesiantreg package.
min	a number indicatein the minimum number that can be generated from the Jeffrey's distribution.
max	a number indicatein the maximum number that can be generated from the Jeffrey's distribution.

Details

generates random numbers from the Jeffrey's distribution

Value

grados	the random number

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

summary.Bayesiantreg *summary of the Bayesian t regression*

Description

Summarized the Bayesian Bayesian t Regression: joint mean and variance modeling and estimation of the degrees of freedom

Usage

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

Arguments

object	an object of class Bayesiantreg
...	not used.

Value

call	Call
coefficients	Coefficients.
AIC	AIC of the model.
BIC	BIC of the model.
DIC	BIC of the model.
PseudoDeviance	Pseudo deviance criteria of the model as is proposed by Marin and Cepeda (_).

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

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3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

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tabla *probabilities and numbers from the Jeffrey's distribution*

Description

generates a table with diferente probabilities and associated numbers from the Jeffrey's distribution

Usage

```
tabla(min, max, p)
```

Arguments

min	a number indicatein the minimum number that can be generated from the Jeffrey's distribution.
max	a number indicatein the maximum number that can be generated from the Jeffrey's distribution.
p	a number indicating the parameter value for the Jeffrey's prior an the Jeffrey's proposal.

Details

generates a table with diferente probabilities and associated numbers from the Jeffrey's distribution

Value

matriz	a matrix with the generated probabilities and associated numbers from the Jeffrey's distribution

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

---

vero *Loglikelihood for the t model*

Description

Calculate the loglikelihood for the t model

Usage

```
vero(y, mu, sigma2, grados)
```

Arguments

y	object of class matrix, with the dependent variables.
mu	object of class matrix, with the mean of the model.
sigma2	object of class matrix, with the variace of the model.
grados	a vector with the degrees of freedom of the model.

Details

Calculate the loglikelihood for the t model as proposed by Marin and Cepeda (_).

Value

l	a value with the loglikelihood for the t model

Author(s)

Margarita Marin <mmarinj@unal.edu.co>, Edilberto Cepeda-Cuervo <ecepedac@unal.edu.co>

References

1. Marin and Cepeda-Cuervo (_). A Bayesian regression model for the non-standardized t distribution with location, scale and degrees of freedom parameters. Unpublished

2. Cepeda-Cuervo E. (2001). Modelagem da variabilidade em modelos lineares generalizados. Unpublished Ph.D. tesis. Instituto de Matematicas. Universidade Federal do Rio do Janeiro.

3. Cepeda C., E. and Gamerman D. (2001). Bayesian Modeling of Variance Heterogeneity in Normal Regression Models. Brazilian Journal of Probability and Statistics. 14, 207-221

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