

Package ‘BVSLR’

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Title Bayesian Approach for Variable Selection

Version 1.0

Description This contains functions from novel bayesian approach for variable selection.

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LazyData true

Roxygen list(markdown = TRUE)

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Depends R (>= 2.10)

Imports magrittr, mvtnorm, extraDistr, stats

NeedsCompilation no

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AssignValue	<i>AssignValue</i>
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Description

AssignValue

Usage

```
AssignValue(x, idx, value)
```

Arguments

x	vector to be modified
idx	index of elements to be modified
value	values to be assigned

Value

the vector after modified x

fconditionBeta	<i>fconditionBeta</i>
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Description

fconditionBeta

Usage

```
fconditionBeta(beta, sig2, g, A, data.X, data.Y, n.size, p.size, log.p = F)
```

Arguments

beta	β
sig2	σ^2
g	g-prior
A	random set, A
data.X	predictors
data.Y	responses
n.size	sample size
p.size	number of parameter
log.p	logical. If TRUE, probability p is given as log(p)

Value

full conditional density of β

fconditionGprior	<i>fconditionGprior</i>
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Description

fconditionGprior

Usage

```
fconditionGprior(g, beta, sig2, A, data.X, data.Y, n.size, p.size, log.p = F)
```

Arguments

g	g-prior
beta	β
sig2	σ^2
A	random set, A
data.X	predictors
data.Y	responses
n.size	sample size
p.size	number of parameter
log.p	logical. If TRUE, probability p is given as log(p)

Value

full conditional density of g

fconditionRandomset	<i>fconditionRandomset</i>
---------------------	----------------------------

Description

fconditionRandomset

Usage

```
fconditionRandomset(
  A,
  beta,
  sig2,
  g,
  data.X,
  data.Y,
  p.prio,
  n.size,
  p.size,
  power.l,
  log.p = F
)
```

Arguments

A	random set, A
beta	β
sig2	σ^2
g	g-prior
data.X	predictors
data.Y	responses
p.prio	prior probability
n.size	sample size
p.size	number of parameter
power.l	power transformation of truncated binomial
log.p	logical. If TRUE, probability p is given as log(p)

Value

full conditional density of A

fconditionSigma2	<i>fconditionSigma2</i>
------------------	-------------------------

Description

fconditionSigma2

Usage

```
fconditionSigma2(
  sig2,
  beta,
  g,
  A,
  data.X,
  data.Y,
  n.size,
  p.size,
  sig.a,
  sig.b,
  log.p = F
)
```

Arguments

sig2	σ^2
beta	β
g	g-prior
A	random set, A

data.X	predictors
data.Y	responses
n.size	sample size
p.size	number of parameter
sig.a	parameter a for full conditional of σ^2
sig.b	parameter b for full conditional of σ^2
log.p	logical. If TRUE, probability p is given as log(p)

Value

full conditional density of σ^2

MHAlgorithm	<i>MHAlgorithm</i>
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Description

MHAlgorithm

Usage

```
MHAlgorithm(
  sim.size,
  data,
  p.prio = NULL,
  tune.p_h,
  tune.eps_sig,
  tune.eps_g,
  tune.mu_truncbinom,
  tune.sig_a,
  tune.sig_b,
  ini.g = NULL,
  ini.sig2 = NULL,
  ini.A = NULL,
  ini.beta = NULL
)
```

Arguments

sim.size	simulation sample size
data	observed data
p.prio	prior of p can be specified
tune.p_h	tuning parameter
tune.eps_sig	tuning parameter
tune.eps_g	tuning parameter
tune.mu_truncbinom	tuning parameter

tune.sig_a	tuning parameter
tune.sig_b	tuning parameter
ini.g	initial value g
ini.sig2	initial value σ^2
ini.A	initial random set, A
ini.beta	initial β

Value

simulation samples and acceptance rate

Examples

```
## Not run:
MHAlgorithm(sim.size = 50000, data = cbind(diabetes.data$y,diabetes.data$x),
  tune.p_h = 0.5, tune.eps_sig = 0.1, tune.eps_g = 60,
  tune.mu_truncbinom = 2.5, tune.sig_a = 0.001, tune.sig_b = 0.001)

## End(Not run)
```

PriorProbability	<i>PriorProbability</i>
------------------	-------------------------

Description

PriorProbability

Usage

```
PriorProbability(data.X, data.Y)
```

Arguments

data.X	predictors
data.Y	responses

Value

prior probability with calculate correlation between predictors and responses

probBeta	<i>probBeta</i>
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Description

probBeta

Usage

```
probBeta(betat1, At1, gt1, sig2t1, data.X, data.Y, n.size, p.size, log.p = F)
```

Arguments

betat1	β at time $t + 1$
At1	random set, A at time $t + 1$
gt1	g-prior, g at time $t + 1$
sig2t1	σ^2 at time $t + 1$
data.X	predictors
data.Y	responses
n.size	sample size
p.size	number of predictor
log.p	logical. If TRUE, probability p is given as log(p)

Valueproposal density of β

probGprior	<i>probGprior</i>
------------	-------------------

Description

probGprior

Usage

```
probGprior(gt1, gt, eps_g, log.p = F)
```

Arguments

gt1	g-prior, g at time $t + 1$
gt	g-prior, g at time t
eps_g	parameter for proposal function of g
log.p	logical. If TRUE, probability p is given as log(p)

Value

proposal density of g

probRandomsetA	<i>probRandomsetA</i>
----------------	-----------------------

Description

probRandomsetA

Usage

```
probRandomsetA(At1, At, ch, p.prio)
```

Arguments

At1	random set, A at time t + 1
At	random set, A at time t
ch	c_h indicator of model change
p.prio	prior probability

Value

proposal density of A

probSigma2	<i>probSigma2</i>
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Description

probSigma2

Usage

```
probSigma2(sig2t1, sig2t, eps_sig, log.p = F)
```

Arguments

sig2t1	σ^2 at time t + 1
sig2t	σ^2 at time t
eps_sig	parameter for proposal function of σ^2
log.p	logical. If TRUE, probability p is given as log(p)

Value

proposal density of σ^2

qAlpha	<i>qAlpha</i>
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Description

qAlpha

Usage

qAlpha(alp, At, p.prio)

Arguments

- | | |
|--------|-------------------------|
| alp | element in A |
| At | random set, A at time t |
| p.prio | prior probability |

Value

α for A_t

qBeta	<i>qBeta</i>
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Description

qBeta

Usage

qBeta(At1, gt1, sig2t1, data.X, data.Y, n.size, p.size)

Arguments

- | | |
|--------|-----------------------------|
| At1 | random set, A at time t + 1 |
| gt1 | g-prior, g at time t + 1 |
| sig2t1 | σ^2 at time t + 1 |
| data.X | predictors |
| data.Y | responses |
| n.size | sample size |
| p.size | number of predictor |

Value

β_{t+1}

qGprior	<i>qGprior</i>
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Description

qGprior

Usage

qGprior(gt, eps_g)

Arguments

gt	g-prior, g at time t
eps_g	parameter for proposal function of g

Value

g_{t+1}

qRandomsetA	<i>qRandomsetA</i>
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Description

qRandomsetA

Usage

qRandomsetA(p.size, At, ch, p.prio)

Arguments

p.size	number of parameter
At	random set, A at time t
ch	c_h indicator of model change
p.prio	prior probability

Value

A_{t+1}

qSigma2	<i>qSigma2</i>
---------	----------------

Description

qSigma2

Usage

qSigma2(sig2t, eps_sig)

Arguments

sig2t	σ^2 at time t
eps_sig	parameter for proposal function of σ^2

Value

σ^2_{t+1}

RidgeLambda	<i>RidgeLambda</i>
-------------	--------------------

Description

RidgeLambda

Usage

RidgeLambda(n.size, p.size, kt)

Arguments

n.size	sample size
p.size	number of predictor
kt	model size at time t

Value

lambda value by formula 2.4

SimdataN100P10

This is the data set to be included in this package

Description

This is the data set to be included in this package

Usage

SimdataN100P10

Format

100 simulation data set with $n=100$ and $p=10$

SimdataN50P100

This is the data set to be included in this package

Description

This is the data set to be included in this package

Usage

SimdataN50P100

Format

100 simulation data set with $n=50$ and $p=100$

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