Package 'bltm'

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Title Bayesian Latent Threshold Modeling

Version 0.1.0

Description Fits latent threshold model for simulated data
and describes how to adjust model using real data. Implements algorithm
proposed by Nakajima and West (2013) <doi:10.1080/07350015.2012.747847>.
This package has a function to generate data, a function to configure
priors and a function to fit the model. Examples may be checked inside
the demonstration files.

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Encoding UTF-8

LazyData true

URL `https://github.com/curso-r/bltm`

BugReports `https://github.com/curso-r/bltm/issues`

Imports mvnfast, Rfast

RoxygenNote 6.1.1

NeedsCompilation no

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R topics documented:

`create_prior_parameters` *Create the prior parameters.*

Description

Define the priors parameters to be used with `ltm_mcmc()`.

Usage

```
create_prior_parameters(a_mu0 = 0, a_s0 = 0.1, n0 = 6, S0 = 0.06,
  v0 = 6, V0 = 0.06, m0 = 0, s0 = 1, a0 = 20, b0 = 1.5)
```

Arguments

`a_mu0`	mean of alpha normal distribution.
`a_s0`	standard deviation of alpha's normal distribution.
`n0`	sig2 inverse gamma shape parameter.
`S0`	sig2 inverse gamma location parameter.
`v0`	sig_eta inverse gamma shape parameter.
`V0`	sig_eta inverse gamma location parameter.
`m0`	mu normal's mean parameter.
`s0`	mu normals standard deviation.
`a0`	a0 beta's shape parameter.
`b0`	a0 beta's location parameter.

Details

Considering the following priors:

- alpha ~ N(mu0, s0)
- sig2 ~ IG(n0/2, S0/2)
- sig_eta ~ IG(v0/2, V0/2)
- mu ~ N(m0, s0^2)
- (phi+1)/2 ~ Beta(a0, b0)

Value

List containing the hyperparameters used to fit the model. The default parameters are the same of the simulation example of the paper.

References

Nakajima, Jouchi, and Mike West. "Bayesian analysis of latent threshold dynamic models." Journal of Business & Economic Statistics 31.2 (2013): 151-164.

`ltm_mcmc` *MCMC LTM*

Description

Given `x` and `y` performs the MCMC optimization.

Usage

```
ltm_mcmc(x, y, burnin = 2000, iter = 8000, K = 3,
  prior_par = create_prior_parameters())
```

Arguments

`x`	data points
`y`	response variable
`burnin`	number of burnin iterations
`iter`	number of iterations after burnin
`K`	parameter K
`prior_par`	List of parameters for prior distrributions. See `create_prior_parameters()`.

Value

matrix containing the posterior samples. Each line is one sample after the burnin period and each column is one of the parameters of the model. Columns are named to find the parameters with ease.

References

Nakajima, Jouchi, and Mike West. "Bayesian analysis of latent threshold dynamic models." Journal of Business & Economic Statistics 31.2 (2013): 151-164.

Examples

```
# Generates 10 series, each one with 500 observations and 2 regressors.

d_sim <- ltm_sim(
  ns = 500, nk = 2, ni = 10,
  vmu = matrix(c(.5,.5), nrow = 2),
  mPhi = diag(2) * c(.99, .99),
  mSigs = c(.1,.1),
  dsig = .15,
  vd = matrix(c(.4,.4), nrow = 2),
  alpha = 0
)

# Fit model

fit_model <- ltm_mcmc(d_sim$mx, d_sim$vy, burnin = 0, iter = 2)
```

`ltm_sim` *Simulate LTM model*

Description

Simulate LTM model using many

Usage

```
ltm_sim(ns, nk, ni, vmu, mPhi, mSigs, dsig, vd, alpha)
```

Arguments

`ns`	number of times
`nk`	number of covariates
`ni`	number of series
`vmu`	vector mu
`mPhi`	phi diagonal matrix with the parameters
`mSigs`	sigma eta vector
`dsig`	general sigma
`vd`	threshold parameter
`alpha`	intercept

Value

List containing the generated y, x, beta and thresholded beta.

References

Nakajima, Jouchi, and Mike West. "Bayesian analysis of latent threshold dynamic models." Journal of Business & Economic Statistics 31.2 (2013): 151-164.

Examples

```
# Generates 10 series, each one with 500 observations and 2 regressors.

d_sim <- ltm_sim(
  ns = 500, nk = 2, ni = 10,
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  mPhi = diag(2) * c(.99, .99),
  mSigs = c(.1,.1),
  dsig = .15,
  vd = matrix(c(.4,.4), nrow = 2),
  alpha = 0
)

str(d_sim)
```