Description

logit.mh.w.gibbs:Function which produces one or multiple *univariate* Metropolis-Hastings chains for logistic regression cases of the type

$$\log it\left(p_i\right) = a + bx_i, \text{ with } y_i \mid p_i \sim Bin(n_i, p_i) \text{ for } i = 1,...,n_i$$

with prior specification $a \sim N(0,k)$, $b \sim N(0,k)$ and normal random walk proposals

$a^t \sim N(a^{t-1}, \sigma_a^2)$
$b^t \sim N(b^{t-1}, \sigma_b^2)$

Usage

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logit.mh.w.gibbs(y, x, sizes, n, l=1, discard=n/2, initial.matrix, sd, hyper.par=1000,
                 update=FALSE, plot=TRUE)
```

Arguments

y: the vector containing the y_i's.

x: the vector containing the x_i's.

sizes: the vector containing the n_i's .

n: the number of univariate Metropolis-Hastings iterations.

l: the number of univariate Metropolis-Hastings chains to be produced, the default choice is 1 chain.

discard: the number of discarded iterations for the "burn-in" period. The default value n/2 discards the first half of the chain. This arguments must *always* be smaller than *n*.

initial.matrix: A matrix which contains the initial values of the simulation. This argument must be given in matrix form. If l=1 (one chain) the initial.matrix must be of dimension 1×2 with column one containing the initial value for parameter *a* and column two the initial value for parameter *b*. If l>1 i.e. l=4 then the initial matrix must be of dimension 4×2. In this case the 1st column must contain 4 initial values for parameter *a* and the 2nd column must contain 4 initial values for parameter *b*.

sd: A vector with two elements corresponding to the proposals *standard deviations* σ_a and σ_b for parameters *a* (1st element) and *b* (2nd element).

hyper.par: a scalar corresponding to *k*, the default value is $k = 1000$.

update: A logical argument. If TRUE then the initial choices for parameters σ_a and σ_b are replaced at iterations n/4, n/2 and 3n/4 with the MCMC estimates acquired by the preceding draws of parameters *a*, *b* belonging to the intervals [1,n/4], (n/4,n/2] and (n/2,3n/4] respectively.

plot: A logical argument. If TRUE and l=1 (one chain) then time series plots, autocorrelation plots and histograms for the draws of parameters *a*, *b* are returned. If TRUE and l>1 (multilple chains) then ergodic mean plots and histograms for the draws of parameters *a*, *b* are returned.

Components

logit.mh.w.gibbs returns the following components:

parameters: The draws of parameters from the posterior distribution.

acceptance_ratio: The acceptance ratio of each chain and each parameter.

R_root: The calculated R reduction measure (returned only if *l*>1).

lengths: The size of the MCMC sample kept for inference.

means: The posterior means of the parameters.

standard.deviations: The posterior standard deviations of the parameters.

correlations: The posterior correlation matrix of the parameters.

quantiles: The posterior quantiles of the parameters.