Package 'BGSIMD'

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Type Package

Title Block Gibbs Sampler with Incomplete Multinomial Distribution

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Description Implement an efficient block Gibbs sampler with incomplete data from a multinomial distribution taking values from the k categories 1,2,...,k, where data are assumed to miss at random and each missing datum belongs to one and only one of m distinct non-empty proper subsets A1, A2,..., Am of 1,2,...,k and the k categories are labelled such that only consecutive A's may overlap.

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BGSIMD-package *Efficient Block Gibbs Sampler with Data from an Incomplete Multinomial Distribution*

Description

Implement an efficient block Gibbs sampler for Bayesian analysis with incomplete data from a multinomial distribution taking values from the k categories 1,2,...,k, where data are assumed to miss at random and each missing datum belongs to one and only one of m distinct non-empty proper subsets A1, A2,..., Am of 1,2,...,k and the k categories are labelled such that only consecutive A's may overlap.

Details

Package:	BGSIMD
Type:	Package
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Author(s)

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References

Ahn, K. W. and Chan, K. S. (2007) Efficient Markov chain Monte Carlo with incomplete multinomial data, Technical report 382, The University of Iowa

block.gibbs *Efficient Block Gibbs Sampling with Incomplete Data from a Multinomial Distribution*

Description

The function implements an efficient block Gibbs sampling for Bayesian analysis with incomplete data from a multinomial distribution with k categories labelled as 1,2,...,k, where the incomplete data are assumed to arise from missing at random. It is assumed that each missing datum belongs to one and only one of m subsets A1,...,Am each of which is a non-empty proper subset of 1,2,..,k. Moreover, it is assumed that the A's are such that only consecutive A's may overlap. Specifically, it is assumed that the data consist of counts of complete data, as well as the counts of partially

observed data belonging to the A's. The multinomial parameters are assumed to have a Dirichlet prior.

Usage

```
block.gibbs(complete, missing, ms, prior, init, n)
```

Arguments

`complete`	A numeric vector. The counts of completely classified observations. The length of the vector is set to be k. By default, the multinomial distribution then has k categories labelled from 1 to k.
`missing`	A numeric vector. The counts of partially classified observations. By default, m equals the length of `missing`.
`ms`	A list containing the A's listed in the order of the counts of data in the A's listed in `missing`.
`prior`	A numeric vector. The parameter vector of the Dirichlet prior.
`init`	A numeric vector. The initial parametric values for the Gibbs sampler.
`n`	The number of Gibbs samples.

Author(s)

Kwang Woo Ahn and Kung-Sik Chan

References

Ahn, K. W. and Chan, K. S. (2007) Efficient Markov chain Monte Carlo with incomplete multinomial data, Technical report 382, The University of Iowa

See Also

`part`, `partition`, and `rdirichlet`

Examples

```
complete<-c(20,655,17,15,11,8,5,10,4) # so k=9, and
# there are 20 observed counts of 1's, 655 counts of 2's, etc.
missing<-c(34,21,18) # so m=3
ms<-list(c(3,4),c(5,6,7),c(6,7,8,9)) # three kind of
#  missing data, namely, some data are only known to belong to {3,4},
# some known to belong to {5,6,7} and some belong to {6,7,8,9}.
prior<-rep(1,9)
init<-rep(1/9,9)
n<-110
block.temp<-block.gibbs(complete,missing,ms,prior,init,n) # obtain 110 samples
apply(block.temp[,11:110],1,mean) # burn-in is 10 and obtain the posterior mean
```

part *Partition Sets of Two Sets*

Description

The function computes the three partition sets of two sets. That is, given two sets A and B, the function returns the set of A-B, AB and B-A where AB is the intersection of A and B, A-B=the intersection of A and B complement.

Usage

```
part(ms1, ms2)
```

Arguments

ms1	A numeric vector. The first set
ms2	A numeric vector. The second set

Value

A list consisting of the three partition sets.

Author(s)

Kwang Woo Ahn and Kung-Sik Chan

See Also

setdiff, intersect, and partition

Examples

```
ms1<-c(1,3,7,9,10)
ms2<-c(7,9,10,12,13)
part(ms1,ms2)
```

partition — *The Coarsest Partition of a Finite Sequence of Sets for Which Only Consecutive Sets May Overlap*

Description

The function computes the coarsest partition of a finite sequence of sets for which only consecutive sets may overlap.

Usage

```
partition(ms)
```

Arguments

ms	the sequence of finite sets whose coarsest partition is required. These sets must be entered in the order under which only consecutive sets may have non-empty intersection.

Value

A list comprising the sets that make up the coarsest partition.

Author(s)

Kwang Woo Ahn and Kung-Sik Chan

See Also

part and block.gibbs

Examples

```
ms<-list(c(3,4),c(5,6,7),c(6,7,8,9))
partition(ms)
```

rdirichlet — *Random Sampling from the Dirichlet Distribution*

Description

The function outputs a random sample from the Dirichlet distribution.

Usage

```
rdirichlet(n, alpha)
```

Arguments

n	Sample size
alpha	Parameter vector

Author(s)

Code is taken from Greg's Miscellaneous Functions (gregmisc). His code was based on code posted by Ben Bolker to R-News on 15 Dec 2000.

See Also

rbeta

Examples

```
x <- rdirichlet(10, c(1,2,3) )
```

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