Package 'BayesPiecewiseICAR'

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Type Package

Title Hierarchical Bayesian Model for a Hazard Function

Version 0.2.1

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Description Fits a piecewise exponential hazard to survival data using a Hierarchical Bayesian model with an Intrinsic Conditional Autoregressive formulation for the spatial dependency in the hazard rates for each piece. This function uses Metropolis- Hastings-Green MCMC to allow the number of split points to vary. This function outputs graphics that display the histogram of the number of split points and the trace plots of the hierarchical parameters. The function outputs a list that contains the posterior samples for the number of split points, the location of the split points, and the log hazard rates corresponding to these splits. Additionally, this outputs the posterior samples of the two hierarchical parameters, Mu and Sigma^2.

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LazyData TRUE

RoxygenNote 5.0.1

Depends mvtnorm

NeedsCompilation no

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R topics documented:

ICARBHSampler *This function fits a piecewise hazard using a hierarchical model with a ICAR dependence applied to the hazard heights*

Description

This function fits a piecewise hazard using a hierarchical model with a ICAR dependence applied to the hazard heights

Usage

```
ICARBHSampler(Y, I, B, hyper)
```

Arguments

Y	This is a n-vector containing patient survival times
I	This is a n-vector containing patient censoring indicators (0 for censored patient)
B	Number of iterations to run the sample
hyper	Vector of hyperparameters. In order, this contains a1, b1 which are the inverse gamma hyperparameters on sigma^2. Phi which is the hyperparameter on the mean number of split points. Jmax which is the maximum allowed number of split points. cl1 which is a tuning parameter greater than 0. J1 is the starting number of split points for the MCMC. Finally, clam1 which is between 0 and 1 and characterizes the spatial dependency of the baseline hazard heights.

Value

Returns a list containing the posterior samples of the split points, split point locations, log hazard rates and hierarchical samples

References

https://adventuresinstatistics.wordpress.com/2016/07/29/bayespiecewiseicar-tutorial-and-details/

Lee, K. H., Haneuse, S., Schrag, D. and Dominici, F. (2015), Bayesian semiparametric analysis of semicompeting risks data: investigating hospital readmission after a pancreatic cancer diagnosis. Journal of the Royal Statistical Society: Series C (Applied Statistics), 64: 253-273.

Examples

```
####This generates random survival data
 Y=rexp(100,1/20)
 I=rbinom(100,1,.5)
 ###Sets hyperparameters
 a1=.7
 b1=.7
 phi=3
 Jmax=20
```

```
cl1=.25
clam1=.5
J1=3
###Combines the hyperparameters in to a vector
hyper=c(a1,b1,phi,Jmax,cl1,J1,clam1)
###Set Number of iterations
B=100
###Run the Sampler
X=ICARBHSampler(Y,I,B,hyper)
X
```

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