

Package ‘meteorits’

July 21, 2019

Type Package

Title Mixtures-of-experts modeling for complex and non-normal distributions ('MEteorits')

Version 0.1.0

Description meteorits is an open source toolbox (available in R and in Matlab) containing several original and flexible mixtures-of-experts models to model, cluster and classify heterogeneous data in many complex situations where the data are distributed according to non-normal, possibly skewed distributions, and when they might be corrupted by atypical observations. The toolbox also contains sparse mixture-of-experts models for high-dimensional data.

URL <https://github.com/fchamroukhi/MEteorits>

License GPL (>= 3)

Depends R (>= 2.10)

Imports pracma,
methods,
stats,
Rcpp

Suggests knitr,
rmarkdown

LinkingTo Rcpp,
RcppArmadillo

Collate meteorits-package.R
RcppExports.R
logsumexp.R
utils.R
FData.R
ParamSNMoE.R
ParamStMoE.R
ParamTMoE.R
ParamNMoE.R
StatSNMoE.R
StatStMoE.R
StatTMoE.R
StatNMoE.R
ModelSNMoE.R
ModelStMoE.R
ModelTMoE.R
ModelNMoE.R

```

emSNMoE.R
emStMoE.R
emTMoE.R
emNMoE.R

```

VignetteBuilder knitr

Encoding UTF-8

LazyData true

Roxygen list(markdown = TRUE)

RoxygenNote 6.1.1

R topics documented:

emNMoE	2
emSNMoE	3
emStMoE	4
emTMoE	5
FData-class	6
ModelNMoE-class	7
ModelSNMoE-class	7
ModelStMoE-class	7
ModelTMoE-class	8
ParamNMoE-class	8
ParamSNMoE-class	9
ParamStMoE-class	9
ParamTMoE-class	10
StatNMoE-class	10
StatSNMoE-class	12
StatStMoE-class	13
StatTMoE-class	14
Index	16

emNMoE

emNMoE implements the EM algorithm to fit a NMoE model.

Description

emNMoE implements the maximum-likelihood parameter estimation of a NMoE model by the Expectation-Maximization (EM) algorithm.

Usage

```

emNMoE(X, Y, K, p = 3, q = 1, n_tries = 1, max_iter = 1500,
        threshold = 1e-06, verbose = FALSE, verbose_IRLS = FALSE)

```

Arguments

X	Numeric vector of length n representing the covariates/inputs x_1, \dots, x_m .
Y	Numeric vector of length n representing the observed response/output y_1, \dots, y_m .
K	The number of expert components.
p	The order of the polynomial regression for the expert regressors network.
q	The dimension of the logistic regression for the gating network. For the purpose of segmentation, it must be set to 1.
n_tries	Number of times EM algorithm will be launched with different initializations. The solution providing the highest log-likelihood will be returned.
max_iter	The maximum number of iterations for the EM algorithm.
threshold	A numeric value specifying the threshold for the relative difference of log-likelihood between two steps of the EM as stopping criteria.
verbose	A logical value indicating whether values of the log-likelihood should be printed during EM iterations.
verbose_IRLS	A logical value indicating whether values of the criterion optimized by IRLS should be printed at each step of the EM algorithm.

Details

emNMoe function implements the EM algorithm for the NMoe model. This functions starts with an initialization of the parameters done by the method `initParam` of the class [ParamNMoe](#), then it alternates between a E-Step (method of the class [StatNMoe](#)) and a M-Step (method of the class [ParamNMoe](#)) until convergence (until the absolute difference of log-likelihood between two steps of the EM algorithm is less than the `threshold` parameter).

Value

The EM algorithm returns an object of class [ModelNMoe](#).

See Also

[ModelNMoe](#), [ParamNMoe](#), [StatNMoe](#)

emSNMoE

emSNMoE implements the ECM algorithm to fit a SNMoE model.

Description

emSNMoE implements the maximum-likelihood parameter estimation of a SNMoE model by the Expectation Conditional Maximization (ECM) algorithm.

Usage

```
emSNMoE(X, Y, K, p = 3, q = 1, n_tries = 1, max_iter = 1500,
        threshold = 1e-06, verbose = FALSE, verbose_IRLS = FALSE)
```

Arguments

X	Numeric vector of length n representing the covariates/inputs x_1, \dots, x_m .
Y	Numeric vector of length n representing the observed response/output y_1, \dots, y_m .
K	The number of expert components.
p	The order of the polynomial regression for the expert regressors network.
q	The dimension of the logistic regression for the gating network. For the purpose of segmentation, it must be set to 1.
n_tries	Number of times ECM algorithm will be launched with different initializations. The solution providing the highest log-likelihood will be returned.
max_iter	The maximum number of iterations for the ECM algorithm.
threshold	A numeric value specifying the threshold for the relative difference of log-likelihood between two steps of the ECM as stopping criteria.
verbose	A logical value indicating whether values of the log-likelihood should be printed during ECM iterations.
verbose_IRLS	A logical value indicating whether values of the criterion optimized by IRLS should be printed at each step of the ECM algorithm.

Details

emSNMoE function implements the ECM algorithm for the SNMoE model. This function starts with an initialization of the parameters done by the method `initParam` of the class [ParamSNMoE](#), then it alternates between a E-Step (method of the class [StatSNMoE](#)) and a CM-Step (method of the class [ParamSNMoE](#)) until convergence (until the absolute difference of log-likelihood between two steps of the ECM algorithm is less than the threshold parameter).

Value

The ECM algorithm returns an object of class [ModelSNMoE](#).

See Also

[ModelSNMoE](#), [ParamSNMoE](#), [StatSNMoE](#)

emStMoE

emStMoE implements the ECM algorithm to fit a StMoE model.

Description

emStMoE implements the maximum-likelihood parameter estimation of a StMoE model by the Expectation Conditional Maximization (ECM) algorithm.

Usage

```
emStMoE(X, Y, K, p = 3, q = 1, n_tries = 1, max_iter = 1500,
        threshold = 1e-06, verbose = FALSE, verbose_IRLS = FALSE)
```

Arguments

X	Numeric vector of length n representing the covariates/inputs x_1, \dots, x_m .
Y	Numeric vector of length n representing the observed response/output y_1, \dots, y_m .
K	The number of expert components.
p	The order of the polynomial regression for the expert regressors network.
q	The dimension of the logistic regression for the gating network. For the purpose of segmentation, it must be set to 1.
n_tries	Number of times ECM algorithm will be launched with different initializations. The solution providing the highest log-likelihood will be returned.
max_iter	The maximum number of iterations for the ECM algorithm.
threshold	A numeric value specifying the threshold for the relative difference of log-likelihood between two steps of the ECM as stopping criteria.
verbose	A logical value indicating whether values of the log-likelihood should be printed during ECM iterations.
verbose_IRLS	A logical value indicating whether values of the criterion optimized by IRLS should be printed at each step of the ECM algorithm.

Details

emStMoE function implements the ECM algorithm for the StMoE model. This function starts with an initialization of the parameters done by the method `initParam` of the class [ParamStMoE](#), then it alternates between a E-Step (method of the class [StatStMoE](#)) and a CM-Step (method of the class [ParamStMoE](#)) until convergence (until the absolute difference of log-likelihood between two steps of the ECM algorithm is less than the `threshold` parameter).

Value

The ECM algorithm returns an object of class [ModelStMoE](#).

See Also

[ModelStMoE](#), [ParamStMoE](#), [StatStMoE](#)

emTMoE

emTMoE implements the ECM algorithm to fit a tMoE model.

Description

emTMoE implements the maximum-likelihood parameter estimation of a tMoE model by the Expectation Conditional Maximization (ECM) algorithm.

Usage

```
emTMoE(X, Y, K, p = 3, q = 1, n_tries = 1, max_iter = 1500,
        threshold = 1e-06, verbose = FALSE, verbose_IRLS = FALSE)
```

Arguments

X	Numeric vector of length n representing the covariates/inputs x_1, \dots, x_m .
Y	Numeric vector of length n representing the observed response/output y_1, \dots, y_m .
K	The number of expert components.
p	The order of the polynomial regression for the expert regressors network.
q	The dimension of the logistic regression for the gating network. For the purpose of segmentation, it must be set to 1.
n_tries	Number of times ECM algorithm will be launched with different initializations. The solution providing the highest log-likelihood will be returned.
max_iter	The maximum number of iterations for the ECM algorithm.
threshold	A numeric value specifying the threshold for the relative difference of log-likelihood between two steps of the ECM as stopping criteria.
verbose	A logical value indicating whether values of the log-likelihood should be printed during ECM iterations.
verbose_IRLS	A logical value indicating whether values of the criterion optimized by IRLS should be printed at each step of the ECM algorithm.

Details

emTMoE function implements the ECM algorithm for the tMoE model. This function starts with an initialization of the parameters done by the method `initParam` of the class [ParamTMoE](#), then it alternates between a E-Step (method of the class [StatTMoE](#)) and a CM-Step (method of the class [ParamTMoE](#)) until convergence (until the absolute difference of log-likelihood between two steps of the ECM algorithm is less than the `threshold` parameter).

Value

The ECM algorithm returns an object of class [ModelTMoE](#).

See Also

[ModelTMoE](#), [ParamTMoE](#), [StatTMoE](#)

FData-class

A Reference Class to represent a functional data set.

Description

FData is a reference class which represents general independent and identically distributed (i.i.d.) functional objects. The data can be ordered by time (functional time series). In the last case, the field X represents the time.

Fields

- X Numeric vector of length m .
- Y Matrix of size (n, m) representing n functions of X observed at points $1, \dots, m$.

ModelNMoE-class	<i>A Reference Class which represents a fitted NMoE model.</i>
-----------------	--

Description

ModelNMoE represents a [NMoE](#) model for which parameters have been estimated.

Fields

param A [ParamNMoE](#) object. It contains the estimated values of the parameters.

stat A [StatNMoE](#) object. It contains all the statistics associated to the NMoE model.

See Also

[ParamNMoE](#), [StatNMoE](#)

ModelSNMoE-class	<i>A Reference Class which represents a fitted SNMoE model.</i>
------------------	---

Description

ModelSNMoE represents a [SNMoE](#) model for which parameters have been estimated.

Fields

param A [ParamSNMoE](#) object. It contains the estimated values of the parameters.

stat A [StatSNMoE](#) object. It contains all the statistics associated to the SNMoE model.

See Also

[ParamSNMoE](#), [StatSNMoE](#)

ModelStMoE-class	<i>A Reference Class which represents a fitted StMoE model.</i>
------------------	---

Description

ModelStMoE represents a [StMoE](#) model for which parameters have been estimated.

Fields

param A [ParamStMoE](#) object. It contains the estimated values of the parameters.

stat A [StatStMoE](#) object. It contains all the statistics associated to the StMoE model.

See Also

[ParamStMoE](#), [StatStMoE](#)

ModelTMoE-class

A Reference Class which represents a fitted TMoE model.

Description

ModelTMoE represents a [TMoE](#) model for which parameters have been estimated.

Fields

param A [ParamTMoE](#) object. It contains the estimated values of the parameters.

stat A [StatTMoE](#) object. It contains all the statistics associated to the TMoE model.

See Also

[ParamTMoE](#), [StatTMoE](#)

ParamNMoE-class

A Reference Class which contains parameters of a NMoE model.

Description

ParamNMoE contains all the parameters of a NMoE model.

Fields

fData [FData](#) object representing the sample.

K The number of mixture components.

p The order of the polynomial regression.

q The dimension of the logistic regression. For the purpose of segmentation, it must be set to 1.

nu degree of freedom

alpha is the parameter vector of the logistic model with α_K being the null vector.

beta is the vector of regression coefficients of component k, the updates for each of the expert component parameters consist in analytically solving a weighted Gaussian linear regression problem.

sigma The variances for the K mixture components.

delta the skewness parameter lambda (by equivalence delta)

See Also

[FData](#)

ParamSNMoE-class	<i>A Reference Class which contains parameters of a SNMoE model.</i>
------------------	--

Description

ParamSNMoE contains all the parameters of a SNMoE model.

Fields

fData [FData](#) object representing the sample.
K The number of mixture components.
p The order of the polynomial regression.
q The dimension of the logistic regression. For the purpose of segmentation, it must be set to 1.
nu degree of freedom
alpha is the parameter vector of the logistic model with α_K being the null vector.
beta is the vector of regression coefficients of component k, the updates for each of the expert component parameters consist in analytically solving a weighted Gaussian linear regression problem.
sigma The variances for the K mixture component.
lambda skewness parameter
delta the skewness parameter lambda (by equivalence delta)

See Also

[FData](#)

ParamStMoE-class	<i>A Reference Class which contains parameters of a MRHLP model.</i>
------------------	--

Description

ParamMRHLP contains all the parameters of a MRHLP model.

Fields

fData [FData](#) object representing the sample.
K The number of mixture components.
p The order of the polynomial regression.
q The dimension of the logistic regression. For the purpose of segmentation, it must be set to 1.
nu degree of freedom
alpha is the parameter vector of the logistic model with α_K being the null vector.
beta is the vector of regression coefficients of component k, the updates for each of the expert component parameters consist in analytically solving a weighted Gaussian linear regression problem.
sigma The variances for the K mixture component.
lambda skewness parameter
delta the skewness parameter lambda (by equivalence delta)
nuk degrees of freedom

Methods

`initParam(try_EM, segmental = FALSE)` Method to initialize parameters alpha, beta and sigma.
`MStep(statStMoE, verbose_IRLS)` Method used in the EM algorithm to learn the parameters of the StMoE model based on statistics provided by `statStMoE`.

See Also

[FData](#)

ParamTMoE-class	<i>A Reference Class which contains parameters of a TMoE model.</i>
-----------------	---

Description

ParamTMoE contains all the parameters of a TMoE model.

Fields

`fData` [FData](#) object representing the sample.
`K` The number of mixture components.
`p` The order of the polynomial regression.
`q` The dimension of the logistic regression. For the purpose of segmentation, it must be set to 1.
`nu` degree of freedom
`alpha` is the parameter vector of the logistic model with α_K being the null vector.
`beta` is the vector of regression coefficients of component k, the updates for each of the expert component parameters consist in analytically solving a weighted Gaussian linear regression problem.
`sigma` The variances for the K mixture component.
`delta` the skewness parameter lambda (by equivalence delta)

See Also

[FData](#)

StatNMoE-class	<i>A Reference Class which contains statistics of a NMoE model.</i>
----------------	---

Description

StatNoE contains all the parameters of a [NMoE](#) model.

Fields

- piik** Matrix of size (n, K) representing the probabilities $P(z_i = k; W) = P(z_{ik} = 1; W)$ of the latent variable z_i , $i = 1, \dots, m$.
- z_ik** Hard segmentation logical matrix of dimension (n, K) obtained by the Maximum a posteriori (MAP) rule: $z_{ik} = 1$ if $z_{ik} = \arg \max_k P(z_i = k|Y, W, \beta)$; 0 otherwise, $k = 1, \dots, K$.
- klas** Column matrix of the labels issued from **z_ik**. Its elements are $klas(i) = k$, $k = 1, \dots, K$.
- Wik** Matrix of dimension (nm, K) .
- Ey_k** Matrix of dimension (n, K) .
- Ey** Column matrix of dimension n .
- Var_yk** Column matrix of dimension K .
- Vary** Column matrix of dimension n .
- log_lik** Numeric. Log-likelihood of the StMoE model.
- com_loglik** Numeric. Complete log-likelihood of the StMoE model.
- stored_loglik** Numeric vector. Stored values of the log-likelihood at each EM iteration.
- BIC** Numeric. Value of the BIC (Bayesian Information Criterion) criterion. The formula is $BIC = \log_lik - nu \times \log(n)/2$ with nu the degree of freedom of the StMoE model.
- ICL** Numeric. Value of the ICL (Integrated Completed Likelihood) criterion. The formula is $ICL = com_loglik - nu \times \log(n)/2$ with nu the degree of freedom of the StMoE model.
- AIC** Numeric. Value of the AIC (Akaike Information Criterion) criterion. The formula is $AIC = \log_lik - nu$.
- log_piik_fik** Matrix of size (n, K) giving the values of the logarithm of the joint probability $P(Y_i, z_i = k)$, $i = 1, \dots, n$.
- log_sum_piik_fik** Column matrix of size n giving the values of $\sum_{k=1}^K \log P(Y_i, z_i = k)$, $i = 1, \dots, n$.
- tik** Matrix of size (n, K) giving the posterior probability that Y_i originates from the k -th regression model $P(z_i = k|Y, W, \beta)$.

Methods

MAP() calcule une partition d'un echantillon par la regle du Maximum A Posteriori ?? partir des probabilites a posteriori
 Entrees : post_probab, Matrice de dimensions [n x K] des probabilties a posteriori (matrice de la partition floue)
 n : taille de l'echantillon
 K : nombres de classes
 $klas(i) = \arg \max (post_probab(i,k))$, for all $i=1, \dots, n$
 $1 \leq k \leq K = \arg \max p(z_i=k|x_i; \theta) = \arg \max p(z_i=k; \theta) p(x_i|z_i=k; \theta) / \sum_{l=1}^K p(z_i=l; \theta) p(x_i|z_i=l; \theta)$
 $1 \leq k \leq K$
 Sorties : classes : vecteur collones contenant les classe (1:K)
 Z : Matrice de dimension [nxK] de la partition dure : ses elements sont zik, avec $z_{ik}=1$ si x_i appartient ?? la classe k (au sens du MAP) et zero sinon.

See Also

[ParamNMoE](#), [FData](#)

StatSNMoE-class

*A Reference Class which contains statistics of a SNMoE model.***Description**

StatMRHLP contains all the parameters of a [SNMoE](#) model.

Fields

piik Matrix of size (n, K) representing the probabilities $P(z_i = k; W) = P(z_{ik} = 1; W)$ of the latent variable z_i , $i = 1, \dots, m$.

z_ik Hard segmentation logical matrix of dimension (n, K) obtained by the Maximum a posteriori (MAP) rule: $z_{ik} = 1$ if $z_{ik} = \arg \max_k P(z_i = k | Y, W, \beta)$; 0 otherwise, $k = 1, \dots, K$.

klas Column matrix of the labels issued from **z_ik**. Its elements are $klas(i) = k$, $k = 1, \dots, K$.

Ey_k Matrix of dimension (n, K) .

Ey Column matrix of dimension n .

Var_yk Column matrix of dimension K .

Vary Column matrix of dimension n .

log_lik Numeric. Log-likelihood of the SNMoE model.

com_loglik Numeric. Complete log-likelihood of the SNMoE model.

stored_loglik Numeric vector. Stored values of the log-likelihood at each EM iteration.

BIC Numeric. Value of the BIC (Bayesian Information Criterion) criterion. The formula is $BIC = \log_lik - nu \times \log(n)/2$ with nu the degree of freedom of the SNMoE model.

ICL Numeric. Value of the ICL (Integrated Completed Likelihood) criterion. The formula is $ICL = com_loglik - nu \times \log(n)/2$ with nu the degree of freedom of the SNMoE model.

AIC Numeric. Value of the AIC (Akaike Information Criterion) criterion. The formula is $AIC = \log_lik - nu$.

log_piik_fik Matrix of size (n, K) giving the values of the logarithm of the joint probability $P(Y_i, z_i = k)$, $i = 1, \dots, n$.

log_sum_piik_fik Column matrix of size n giving the values of $\sum_{k=1}^K \log P(Y_i, z_i = k)$, $i = 1, \dots, n$.

tik Matrix of size (n, K) giving the posterior probability that Y_i originates from the k -th regression model $P(z_i = k | Y, W, \beta)$.

E1ik To define.

E2ik To define.

Methods

EStep(paramSNMoE) Method used in the EM algorithm to update statistics based on parameters provided by paramSNMoE (prior and posterior probabilities).

MAP() calcule une partition d'un echantillon par la regle du Maximum A Posteriori ?? partir des probabilites a posteriori Entrees : post_probab , Matrice de dimensions [n x K] des probabilites a posteriori (matrice de la partition floue) n : taille de l'echantillon K : nombres de classes klas(i) = arg max (post_probab(i,k)) , for all i=1,...,n 1<=k<=K = arg max p(zi=klxi;theta) 1<=k<=K = arg max p(zi=k;theta)p(xilzi=k;theta)/suml=1^Kp(zi=l;theta) p(xilzi=l;theta) 1<=k<=K Sorties : classes : vecteur collones contenant les classe (1:K) Z : Matrice de dimension [nxK] de la partition dure : ses elements sont zik, avec zik=1 si xi appartient ?? la classe k (au sens du MAP) et zero sinon.

See Also

[ParamSNMoE](#), [FData](#)

StatStMoE-class

A Reference Class which contains statistics of a StMoE model.

Description

StatMRHLP contains all the parameters of a [StMoE](#) model.

Fields

piik Matrix of size (n, K) representing the probabilities $P(z_i = k; W) = P(z_{ik} = 1; W)$ of the latent variable z_i , $i = 1, \dots, m$.

z_ik Hard segmentation logical matrix of dimension (n, K) obtained by the Maximum a posteriori (MAP) rule: $z_{ik} = 1$ if $z_{ik} = \arg \max_k P(z_i = k|Y, W, \beta)$; 0 otherwise, $k = 1, \dots, K$.

klas Column matrix of the labels issued from **z_ik**. Its elements are $klas(i) = k$, $k = 1, \dots, K$.

Ey_k Matrix of dimension (n, K) .

Ey Column matrix of dimension n .

Var_yk Column matrix of dimension K .

Var_y Column matrix of dimension n .

log_lik Numeric. Log-likelihood of the StMoE model.

com_loglik Numeric. Complete log-likelihood of the StMoE model.

stored_loglik Numeric vector. Stored values of the log-likelihood at each EM iteration.

BIC Numeric. Value of the BIC (Bayesian Information Criterion) criterion. The formula is $BIC = \log_lik - nu \times \log(n)/2$ with nu the degree of freedom of the StMoE model.

ICL Numeric. Value of the ICL (Integrated Completed Likelihood) criterion. The formula is $ICL = com_loglik - nu \times \log(n)/2$ with nu the degree of freedom of the StMoE model.

AIC Numeric. Value of the AIC (Akaike Information Criterion) criterion. The formula is $AIC = \log_lik - nu$.

log_piik_fik Matrix of size (n, K) giving the values of the logarithm of the joint probability $P(Y_i, z_i = k)$, $i = 1, \dots, n$.

log_sum_piik_fik Column matrix of size n giving the values of $\sum_{k=1}^K \log P(Y_i, z_i = k)$, $i = 1, \dots, n$.

tik Matrix of size (n, K) giving the posterior probability that Y_i originates from the k -th regression model $P(z_i = k|Y, W, \beta)$.

wik To define.

dik To define.

stme_pdf skew-t mixture of experts density

E1ik To define.

E2ik To define.

E3ik To define.

Methods

EStep(paramStMoE) Method used in the EM algorithm to update statistics based on parameters provided by paramStMoE (prior and posterior probabilities).

MAP() calcule une partition d'un echantillon par la regle du Maximum A Posteriori ?? partir des probabilites a posteriori Entrees : post_probab, Matrice de dimensions [n x K] des probabilités a posteriori (matrice de la partition floue) n : taille de l'échantillon K : nombres de classes $klas(i) = \arg \max_k (post_probab(i,k))$, for all $i=1,\dots,n$ $1 \leq k \leq K = \arg \max_k p(z_i=k|x_i;\theta)$ $1 \leq k \leq K = \arg \max_k p(z_i=k;\theta) p(x_i|z_i=k;\theta) / \sum_{l=1}^K p(z_i=l;\theta) p(x_i|z_i=l;\theta)$ $1 \leq k \leq K$ Sorties : classes : vecteur collones contenant les classe (1:K) Z : Matrice de dimension [nxK] de la partition dure : ses elements sont z_{ik} , avec $z_{ik}=1$ si x_i appartient a la classe k (au sens du MAP) et zero sinon.

See Also

[ParamStMoE](#), [FData](#)

StatTMOE-class

A Reference Class which contains statistics of a TMOE model.

Description

StatTMOE contains all the parameters of a [TMOE](#) model.

Fields

piik Matrix of size (n, K) representing the probabilities $P(z_i = k; W) = P(z_{ik} = 1; W)$ of the latent variable z_i , $i = 1, \dots, m$.

z_ik Hard segmentation logical matrix of dimension (n, K) obtained by the Maximum a posteriori (MAP) rule: $z_{ik} = 1$ if $z_{ik} = \arg \max_k P(z_i = k|Y, W, \beta)$; 0 otherwise, $k = 1, \dots, K$.

klas Column matrix of the labels issued from z_ik. Its elements are $klas(i) = k$, $k = 1, \dots, K$.

Wik Matrix of dimension (nm, K) .

Ey_k Matrix of dimension (n, K) .

Ey Column matrix of dimension n .

Var_yk Column matrix of dimension K .

Vary Column matrix of dimension n .

log_lik Numeric. Log-likelihood of the StMoE model.

com_loglik Numeric. Complete log-likelihood of the StMoE model.

stored_loglik Numeric vector. Stored values of the log-likelihood at each EM iteration.

BIC Numeric. Value of the BIC (Bayesian Information Criterion) criterion. The formula is $BIC = log_lik - nu \times \log(n)/2$ with nu the degree of freedom of the StMoE model.

ICL Numeric. Value of the ICL (Integrated Completed Likelihood) criterion. The formula is $ICL = com_loglik - nu \times \log(n)/2$ with nu the degree of freedom of the StMoE model.

AIC Numeric. Value of the AIC (Akaike Information Criterion) criterion. The formula is $AIC = log_lik - nu$.

log_piik_fik Matrix of size (n, K) giving the values of the logarithm of the joint probability $P(Y_i, z_i = k)$, $i = 1, \dots, n$.

`log_sum_piik_fik` Column matrix of size n giving the values of $\sum_{k=1}^K \log P(Y_i, z_i = k)$, $i = 1, \dots, n$.

`tik` Matrix of size (n, K) giving the posterior probability that Y_i originates from the k -th regression model $P(z_i = k | Y, W, \beta)$.

Methods

`MAP()` calcule une partition d'un échantillon par la règle du Maximum A Posteriori ?? partir des probabilités a posteriori Entrées : `post_probas` , Matrice de dimensions $[n \times K]$ des probabilités a posteriori (matrice de la partition floue) `n` : taille de l'échantillon `K` : nombres de classes `klas(i) = arg max (post_probas(i,k))` , for all $i=1, \dots, n$ $1 \leq k \leq K = \arg \max p(z_i=k | x_i; \theta)$ $1 \leq k \leq K = \arg \max p(z_i=k; \theta) p(x_i | z_i=k; \theta) / \sum_{l=1}^K p(z_i=l; \theta) p(x_i | z_i=l; \theta)$ $1 \leq k \leq K$ Sorties : `classes` : vecteur colonne contenant les classes (1:K) `Z` : Matrice de dimension $[n \times K]$ de la partition dure : ses éléments sont `zik`, avec `zik=1` si x_i appartient ?? la classe `k` (au sens du MAP) et zéro sinon.

See Also

[ParamStMoE](#), [FData](#)

Index

emNMoE, [2](#)
emSNMoE, [3](#)
emStMoE, [4](#)
emTMoE, [5](#)

FData, [8–11](#), [13–15](#)
FData (FData-class), [6](#)
FData-class, [6](#)

ModelNMoE, [3](#)
ModelNMoE (ModelNMoE-class), [7](#)
ModelNMoE-class, [7](#)
ModelSNMoE, [4](#)
ModelSNMoE (ModelSNMoE-class), [7](#)
ModelSNMoE-class, [7](#)
ModelStMoE, [5](#)
ModelStMoE (ModelStMoE-class), [7](#)
ModelStMoE-class, [7](#)
ModelTMoE, [6](#)
ModelTMoE (ModelTMoE-class), [8](#)
ModelTMoE-class, [8](#)

NMoE, [7](#), [10](#)

ParamNMoE, [3](#), [7](#), [11](#)
ParamNMoE (ParamNMoE-class), [8](#)
ParamNMoE-class, [8](#)
ParamSNMoE, [4](#), [7](#), [13](#)
ParamSNMoE (ParamSNMoE-class), [9](#)
ParamSNMoE-class, [9](#)
ParamStMoE, [5](#), [7](#), [14](#), [15](#)
ParamStMoE (ParamStMoE-class), [9](#)
ParamStMoE-class, [9](#)
ParamTMoE, [6](#), [8](#)
ParamTMoE (ParamTMoE-class), [10](#)
ParamTMoE-class, [10](#)

SNMoE, [7](#), [12](#)
StatNMoE, [3](#), [7](#)
StatNMoE (StatNMoE-class), [10](#)
StatNMoE-class, [10](#)
StatSNMoE, [4](#), [7](#)
StatSNMoE (StatSNMoE-class), [12](#)
StatSNMoE-class, [12](#)
StatStMoE, [5](#), [7](#)
StatStMoE (StatStMoE-class), [13](#)
StatStMoE-class, [13](#)
StatTMoE, [6](#), [8](#)
StatTMoE (StatTMoE-class), [14](#)
StatTMoE-class, [14](#)
StMoE, [7](#), [13](#)
TMoE, [8](#), [14](#)