Package ‘gaussDiff’

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Title Difference Measures for Multivariate Gaussian Probability Density Functions

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Depends R (>= 1.8.0)

Description A collection difference measures for multivariate Gaussian probability density functions, such as the Euclidea mean, the Mahalanobis distance, the Kullback-Leibler divergence, the J-Coefficient, the Minkowski L2-distance, the Chi-square divergence and the Hellinger Coefficient.

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URL https://gitlab.met.fu-berlin.de/StatMet/gaussDiff

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`normdiff` *Difference measures for multivariate Gaussian pdfs*

Description

Various difference measures for Gaussian pdfs are implemented: Euclidean distance of the means, Mahalanobis distance, Kullback-Leibler divergence, J-Coefficient, Minkowski L2-distance, Chi-square divergence and the Hellinger coefficient which is a similarity measure.

Usage

```
normdiff(mu1,sigma1=NULL,mu2,sigma2=sigma1,inv=FALSE,s=0.5,
method=c("Mahalanobis","KL","J","Chisq",
"Hellinger","L2","Euclidean"))
```

Arguments

`mu1`	mean value of pdf 1, a vector
`sigma1`	covariance matrix of pdf 1
`mu2`	mean value of pdf 2, a vector
`sigma2`	covariance matrix of pdf 2
`method`	difference measure to be used, see below
`inv`	if TRUE, 1-Hellinger is reported, default: `inv=FALSE`
`s`	exponent for Hellinger coefficient, default: `s=0.5`

Details

Equations can be found in H.-H. Bock, *Analysis of Symbolic Data*, Chapter *Dissimilarity Measures for Probability Distributions*

Value

A scalar object of class `normdiff` reporting the distance.

Author(s)

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References

H.-H. Bock, *Analysis of Symbolic Data*, Chapter *Dissimilarity measures for Probabilistic Distributions*

Examples

```
library(gaussDiff)
mu1 <- c(0,0,0)
sig1 <- diag(c(1,1,1))
mu2 <- c(1,1,1)
sig2 <- diag(c(0.5,0.5,0.5))

## Euclidean distance
normdiff(mu1=mu1,mu2=mu2,method="Euclidean")

## Mahalanobis distance
normdiff(mu1=mu1,sigma1=sig1,mu2=mu2,method="Mahalanobis")

## Kullback-Leibler divergence
normdiff(mu1=mu1,sigma1=sig1,mu2=mu2,sigma2=sig2,method="KL")
```

```
## J-Coefficient
normdiff(mu1=mu1,sigma1=sig1,mu2=mu2,sigma2=sig2,method="J")

## Chi-sqr divergence
normdiff(mu1=mu1,sigma1=sig1,mu2=mu2,sigma2=sig2,method="Chisq")

## Minkowsi L2 distance
normdiff(mu1=mu1,sigma1=sig1,mu2=mu2,sigma2=sig2,method="L2")

## Hellinger coefficient
normdiff(mu1=mu1,sigma1=sig1,mu2=mu2,sigma2=sig2,method="Hellinger")
```

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