Package ‘SpectralMap’

January 20, 2025

Title Diffusion Map and Spectral Map

Version 1.0

Imports scatterplot3d, graphics, fields

Description
Implements the diffusion map method of dimensionality reduction and spectral method of combining multiple diffusion maps, including creation of the spectra and visualization of maps.

Depends R (>= 3.2.2)

License GNU General Public License version 2

Encoding UTF-8

LazyData true

RoxygenNote 5.0.1

NeedsCompilation no

Author Tianhao Wu [aut, cre]

Maintainer Tianhao Wu <tianhao.wu@yale.edu>

Repository CRAN

Date/Publication 2016-07-07 17:37:38

Contents

`SpectralMap` *Diffusion Map and Spectral Map*

Description

Implements the diffusion map method of dimensionality reduction and spectral method of combining multiple diffusion maps, including creation of the spectra and visualization of maps.

Usage

```
SpectralMap(data, epsilon=0.1, range=1, Plot2D=FALSE, Plot3D=FALSE)
```

Arguments

`data`	a list of datasets and each column in each dataset is a variable
`epsilon`	parameter in the Gaussian kernel
`range`	indexes of the datasets in the data list to be combined and computed. If length(range)==1, only diffusion map will be computed. Otherwise, spectral map will be computed
`Plot2D`	a logical value indicating whether a 2-D map should be plotted
`Plot3D`	a logical value indicating whether a 3-D map should be plotted

Value

`singularvector`	the spectra of either diffusion map or spectral map

Examples

```
#generate two datasets
n <- 100
theta <- 2*pi*seq(from=0, to=1-1/n, by=1/n)
r = (1 + cos(6*theta)/4)

# X is a circle
X1 = cos(theta)
X2 = sin(theta)
X<-data.frame(X1,X2)

#Y is a hexagon
Y1 = r*cos(theta)
Y2 = r*sin(theta)
Y<-data.frame(Y1,Y2)

#create data list
Data<-list(X,Y)

#create the diffusion map of X
example1<-SpectralMap(Data, epsilon=0.1, range=1, Plot2D=TRUE, Plot3D=FALSE)
#create the spectral map from X to Y
example2<-SpectralMap(Data, epsilon=0.1, range=1:2, Plot2D=TRUE, Plot3D=FALSE)
```

Index