Package 'SGCS'

April 8, 2012

Title Spatial Graph based Clustering Summaries for spatial point patterns

Version 1.7

Date 2012-04-08

Author Tuomas Rajala

Maintainer Tuomas Rajala <tuomas.rajala@iki.fi>

Depends spatstat

Description Graph based clustering summaries for spatial point
patterns. Includes Connectivity function, Cumulative
connectivity function and clustering function, plus the triplet intensity function T.

License GPL (>= 2)

Repository CRAN

Date/Publication 2012-04-08 10:51:51

R topics documented:

SGCS-package *Spatial point process statistics based on a geometric graph.*

Description

Three statistical spatial point pattern measures, based on a graph structure over the point pattern data.

```
Functions
------------------
confun      -  Connectivity function
cumconfun   -  Cumulative connectivity function
clustfun    -  Clustering function
Tfun        -  Triplet intensity function T
```

The connectivity function estimates the probability that two points distance r-apart share a graph component. Cumulative connectivity function is like Ripley's K-function but conditioned on the points sharing a graph component. Clustering function is a functional form of the non-spatial graph index, clustering coefficient. Tfun is the intensity of r-triplets.

The package currently supports only geometric graph, but such graphs as k-nearest neighbours graph can be easily included if somebody is interested.

Author(s)

Tuomas Rajala
University of Jyvaskyla, Finland
tuomas.rajala@iki.fi

References

Rajala, Penttinen: Spatial clustering and graph based statistical features, JYU preprints, 2010.

Schladitz, Baddeley: A Third order point process characteristic, SJS, vol 27, 657-671, 2000.

SGCS-funs *Connectivity function, Cumulative Connectivity function and Clustering Function.*

Description

Statistical measures based on edges of a geometric graph structure over a given point pattern data.

The graph given components are used as clusters. In this version we use geometric graph, meaning points x and y are connected if ||x-y||<R for the given range parameter R. Notice that in clustering function, the R equals to the parameter r. If you have a another clustering structure in mind, you can give the spatgraphs-object using the prepGraph parameter.

The main function is spatial.graph.cluster.Fun, but the use of shortcuts confun, cumconfun and clustfun is highly encouraged.

In addition, the triplet intensity function T (Schladitz & Baddeley 2000) is also included for now: The Tfun.

Usage

```
confun(X, r=NULL, R=NULL, h=NULL, ...)
cumconfun(X, r=NULL, R=NULL, ...)
clustfun(X, r=NULL, ...)
Tfun(X, r=NULL, ...)
spatial.graph.cluster.Fun(X, r=NULL, funtype=1, funpars=0,
  minusRange=NULL, toroidal=FALSE,
      doDists=FALSE, doWeights=FALSE,
  prepGraph=NULL, dbg=FALSE)
```

Arguments

X	All: Point pattern object of class ppp from package spatstat.
r	Vector of the range parameters in which to calculate the function value. if NULL, a range from 0 to 1/3 of window length is used.
R	confun, cumconfun: Clustering radius of the graph. If NULL, R=1/sqrt(lambda).
h	confun: Smoothing parameter in kernel-estimation. Box kernel width = 2h. NULL-> h=0.15*R
...	Parametes for the function art1Fun:
funtype	(shortcuts handle) Which function to calculate. confun=1, cumconfun=2, clustfun=3, Tfun=4.
funpars	(shortcuts handle) Additional function parameter(s): confun fpar=c(R,h), cumconfun fpar=R.
minusRange	clustfun, Tfun: Minus-correction parameter. Rectangular window required, NULL means no correction.
toroidal	clustfun, Tfun: Toroidal correction of rectangular window.
doDists	Precalculate distances for faster computation. Be aware of memory consumption n*(n-1).
doWeights	confun,cumconfun: Precalculate translation correction weights for faster computation. Be aware of memory consumption O(n\^2).
prepGraph	An optional graph-object from spatgraphs to be used as the component division of the points.
dbg	Print additional messages.

Value

Object of class `fv`, see `spatstat` for details. Has plot, envelope etc. nice methods.

Author(s)

Tuomas Rajala
University of Jyvaskyla, Finland
tuomas.rajala@iki.fi

References

Rajala, Penttinen: Spatial clustering and graph based statistical features, JYU preprints, 2010.

Schladitz, Baddeley: A Third order point process characteristic, SJS, vol 27, 657-671, 2000.

Index