Package 'cartogram'

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Title Create Cartograms with R

Version 0.2.2

Description Construct continuous and non-contiguous area cartograms.

URL https://github.com/sjewo/cartogram

BugReports https://github.com/sjewo/cartogram/issues

Imports methods, sf, packcircles

Suggests rgeos, sp, rgdal, maptools

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 7.0.2

NeedsCompilation no

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R topics documented:

cartogram_cont *Calculate Contiguous Cartogram Boundaries*

Description

Construct a continuous area cartogram by a rubber sheet distortion algorithm (Dougenik et al. 1985)

Usage

```
cartogram_cont(
  x,
  weight,
  itermax = 15,
  maxSizeError = 1.0001,
  prepare = "adjust",
  threshold = 0.05
)

## S3 method for class 'SpatialPolygonsDataFrame'
cartogram_cont(
  x,
  weight,
  itermax = 15,
  maxSizeError = 1.0001,
  prepare = "adjust",
  threshold = 0.05
)

## S3 method for class 'sf'
cartogram_cont(
  x,
  weight,
  itermax = 15,
  maxSizeError = 1.0001,
  prepare = "adjust",
  threshold = 0.05
)
```

Arguments

x	SpatialPolygonDataFrame or an sf object
weight	Name of the weighting variable in x
itermax	Maximum iterations for the cartogram transformation, if maxSizeError ist not reached
maxSizeError	Stop if meanSizeError is smaller than maxSizeError

prepare	Weighting values are adjusted to reach convergence much earlier. Possible methods are "adjust", adjust values to restrict the mass vector to the quantiles defined by threshold and 1-threshold (default), "remove", remove features with values lower than quantile at threshold, "none", don't adjust weighting values
threshold	Define threshold for data preparation

Value

An object of the same class as x

References

Dougenik, J. A., Chrisman, N. R., & Niemeyer, D. R. (1985). An Algorithm To Construct Continuous Area Cartograms. In The Professional Geographer, 37(1), 75-81.

Examples

```
library(maptools)
library(cartogram)
library(rgdal)
data(wrld_simpl)

# Remove uninhabited regions
afr <- spTransform(wrld_simpl[wrld_simpl$REGION==2 & wrld_simpl$POP2005 > 0,],
                   CRS("+init=epsg:3395"))

# Create cartogram
afr_carto <- cartogram_cont(afr, "POP2005", 3)

# Plot
par(mfcol=c(1,2))
plot(afr, main="original")
plot(afr_carto, main="distorted (sp)")

# Same with sf objects
library(sf)

afr_sf = st_as_sf(afr)

afr_sf_carto <- cartogram_cont(afr_sf, "POP2005", 3)

# Plot
par(mfcol=c(1,3))
plot(afr, main="original")
plot(afr_carto, main="distorted (sp)")
plot(st_geometry(afr_sf_carto), main="distorted (sf)")
```

`cartogram_dorling` *Calculate Non-Overlapping Circles Cartogram*

Description

Construct a cartogram which represents each geographic region as non-overlapping circles (Dorling 1996).

Usage

```
cartogram_dorling(x, weight, k = 5, m_weight = 1, itermax = 1000)

## S3 method for class 'sf'
cartogram_dorling(x, weight, k = 5, m_weight = 1, itermax = 1000)

## S3 method for class 'SpatialPolygonsDataFrame'
cartogram_dorling(x, weight, k = 5, m_weight = 1, itermax = 1000)
```

Arguments

`x`	SpatialPolygonsDataFrame, SpatialPointsDataFrame or an sf object
`weight`	Name of the weighting variable in x
`k`	Share of the bounding box of x filled by the larger circle
`m_weight`	Circles' movements weights. An optional vector of numeric weights (0 to 1 inclusive) to apply to the distance each circle moves during pair-repulsion. A weight of 0 prevents any movement. A weight of 1 gives the default movement distance. A single value can be supplied for uniform weights. A vector with length less than the number of circles will be silently extended by repeating the final value. Any values outside the range [0, 1] will be clamped to 0 or 1.
`itermax`	Maximum iterations for the cartogram transformation.

Value

Non overlaping proportional circles of the same class as x.

References

Dorling, D. (1996). Area Cartograms: Their Use and Creation. In Concepts and Techniques in Modern Geography (CATMOG), 59.

Examples

```
library(maptools)
library(cartogram)
library(rgdal)
data(wrld_simpl)
```

```
# Remove uninhabited regions
afr <- spTransform(wrld_simpl[wrld_simpl$REGION==2 & wrld_simpl$POP2005 > 0,],
                   CRS("+init=epsg:3395"))

# Create cartogram
afr_carto <- cartogram_dorling(afr, "POP2005")

# Plot
par(mfcol=c(1,2))
plot(afr, main="original")

plot(afr, main="distorted (sp)")
plot(afr_carto, col = "red", add=TRUE)

# Same with sf objects
library(sf)

afr_sf = st_as_sf(afr)

afr_sf_carto <- cartogram_dorling(afr_sf, "POP2005")

# Plot
par(mfcol=c(1,3))
plot(afr, main="original")
plot(afr_carto, main="distorted (sp)")
plot(st_geometry(afr_sf_carto), main="distorted (sf)")
```

`cartogram_ncont` *Calculate Non-Contiguous Cartogram Boundaries*

Description

Construct a non-contiguous area cartogram (Olson 1976).

Usage

```
cartogram_ncont(x, weight, k = 1, inplace = TRUE)

## S3 method for class 'SpatialPolygonsDataFrame'
cartogram_ncont(x, weight, k = 1, inplace = TRUE)

## S3 method for class 'sf'
cartogram_ncont(x, weight, k = 1, inplace = TRUE)
```

Arguments

`x`	SpatialPolygonDataFrame or an sf object
`weight`	Name of the weighting variable in x
`k`	Factor expansion for the unit with the greater value

inplace	If TRUE, each polygon is modified in its original place, if FALSE multi-polygons are centered on their initial centroid

Value

An object of the same class as x with resized polygon boundaries

References

Olson, J. M. (1976). Noncontiguous Area Cartograms. In The Professional Geographer, 28(4), 371-380.

Examples

```
library(maptools)
library(cartogram)
library(rgdal)
data(wrld_simpl)

# Remove uninhabited regions
afr <- spTransform(wrld_simpl[wrld_simpl$REGION==2 & wrld_simpl$POP2005 > 0,],
                   CRS("+init=epsg:3395"))

# Create cartogram
afr_nc <- cartogram_ncont(afr, "POP2005")

# Plot
plot(afr)
plot(afr_nc, add = TRUE, col = 'red')

# Same with sf objects
library(sf)

afr_sf = st_as_sf(afr)

afr_sf_nc <- cartogram_ncont(afr_sf, "POP2005")

plot(st_geometry(afr_sf))
plot(st_geometry(afr_sf_nc), add = TRUE, col = 'red')
```

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