Package 'truchet'

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Title Tiles and Random Mosaics Truchet Style Using the 'sf' Framework

Version 0.0.1.1

Description Functions to create Truchet tiles, so called after Sébastien Truchet who was the first to describe the patterns obtained by rotating tiles with respect to each other. This form of tiling is described by Smith and Boucher (1987) <https://muse.jhu.edu/article/600574>.

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Encoding UTF-8

URL https://paezha.github.io/truchet/, https://github.com/paezha/truchet

BugReports https://github.com/paezha/truchet/issues

Imports bezier, checkmate, dplyr, lwgeom, magrittr, methods, purrr, rlang, sf, tidyr

Suggests rmarkdown, gganimate, ggplot2, knitr, imager

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Repository CRAN

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`st_truchet_boutique` *Flexible Truchet tiles*

Description

Flexible Truchet tiles

Usage

```
st_truchet_boutique(x = 0, y = 0, type = "ribbon_1")
```

Arguments

`x`	A number with the x coordinate of the center of the tile
`y`	A number with the y coordinate of the center of the tile
`type`	A single character to designate a type of tile; currently supported options are "ribbon_1", "ribbon_2", "ribbon_3", "ribbon_4", "paradise_1", "paradise_2", "paradise_3", "paradise_4", "silk_1", "silk_2", "silk_3", "silk_4", "rainbow_1", "rainbow_2", "cloud_1", "cloud_2", "cloud_3", "cloud_4"

Value

A data frame with one or more objects of type `sf` representing one or more tiles depending on type

Note

For a discussion of variable tiling patterns see: Robert J.Krawczyk (2020) Infinitely Variable Tiling Patterns: From Truchet to Sol LeWitt Revisited, Patterns, 1:5, 1-4, https://www.cell.com/patterns/fulltext/S2666-3899(20)30112-4 and Robert J.Krawczyk (2011) Truchet tilings revisited, Proceedings of ISAMA 2011, 69-77 https://silo.tips/download/truchet-tilings-revisited

Examples

```
st_truchet_boutique(type = "ribbon_1")
st_truchet_boutique(type = "ribbon_2")
```

st_truchet_dissolve *Dissolving the boundaries of individual tiles in Truchet mosaics*

Description

Dissolving the boundaries of individual tiles in Truchet mosaics

Usage

```
st_truchet_dissolve(mosaic)
```

Arguments

mosaic	a mosaic produced by function st_truchet_ms

Value

An object of type sf with the mosaic after dissolving the boundaries of individual tiles

Examples

```
mosaic <- st_truchet_ms()
mosaic <- st_truchet_dissolve(mosaic)
```

st_truchet_flex *Flexible Truchet tiles*

Description

Flexible Truchet tiles

Usage

```
st_truchet_flex(x = 0, y = 0, type = "Al", b = 1/2)
```

Arguments

x	A number with the x coordinate of the center of the tile
y	A number with the y coordinate of the center of the tile
type	A single character to designate a type of tile; currently supported options are "Ac", "Bc", "Cc", "Dc", "As", "Bs", "Cs", "Ds"
b	A number between zero and one that controls the shape of the boundary between the two parts of the tile

Value

A list with one or more objects of type `sf` representing one or more tiles depending on type

Note

For a discussion of Truchet patterns see: Robert Bosch & Urchin Colley (2013) Figurative mosaics from flexible Truchet tiles, Journal of Mathematics and the Arts, 7:3-4, 122-135, doi:10.1080/17513472.2013.838830

Examples

```
st_truchet_flex(type = "Al")
st_truchet_flex(type = "Cl")
```

`st_truchet_fm` *Mosaics with flexible Truchet tiles*

Description

Mosaics with flexible Truchet tiles

Usage

```
st_truchet_fm(
  df = NULL,
  tiles = c("Al", "Cl"),
  b = 1/2,
  xlim = c(1, 3),
  ylim = c(1, 6)
)
```

Arguments

`df`	an (optional) data frame with the following columns: x and y (the coordinates of the tiles in a 1 by 1 grid), tiles (characters with types of tiles to use for mosaic), b (control of the boundary; defaults to 1/2)
`tiles`	a character vector with types of tiles to use for mosaic (default: `c("dr", "dl")`)
`b`	A number between zero and one that controls the shape of the boundary between the two parts of the tile
`xlim`	a numeric vector of length 2 giving the range of the x coordinates of the mosaic (ignored if argument `df` is an input)
`ylim`	a numeric vector of length 2 giving the range of the y coordinates of the mosaic (ignored if argument `df` is an input)

Value

An object of type `sf` with the tiles arranged as a mosaic

Note

For a discussion of Truchet patterns see http://arearugscarpet.blogspot.com/2014/04/the-curse-of-truchets-ti
html

Examples

```
mosaic <- st_truchet_fm()
plot(mosaic)
mosaic <- st_truchet_fm(b = 1/3)
plot(mosaic)
```

`st_truchet_l` *Truchet tiles made with polygons*

Description

Truchet tiles made with polygons

Usage

```
st_truchet_l(x = 0, y = 0, type = "dl")
```

Arguments

`x`	A number with the x coordinate of the center of the tile
`y`	A number with the y coordinate of the center of the tile
`type`	A single character to designate a type of tile; currently supported options are "dl", "dr"

Value

A list with one or more objects of type `sf` representing one or more tiles depending on type

Note

For a discussion of Truchet patterns see http://arearugscarpet.blogspot.com/2014/04/the-curse-of-truchets-ti
html

Examples

```
st_truchet_l(type = "dl")
st_truchet_l(type = "dr")
```

st_truchet_ms *Truchet mosaics*

Description

Truchet mosaics

Usage

```
st_truchet_ms(
  df = NULL,
  p1 = 1,
  p2 = 0,
  p3 = 0,
  tiles = c("dr", "dl"),
  xlim = c(1, 3),
  ylim = c(1, 6)
)
```

Arguments

df	an (optional) data frame with the following columns: x and y (the coordinates of the tiles in a 1 by 1 grid), tiles (characters with types of tiles to use for mosaic), scale_p (the scale of the tile to be placed at each coordinate)
p1	a number between 0 and 1 with the proportion of spots in the mosaic to cover with tiles of scale 1 (the sum of p1, p2, p3 must be equal to one, or less to avoid empty spots in the mosaic)
p2	a number between 0 and 1 with the proportion of spots in the mosaic to cover with tiles of scale 1/2
p3	a number between 0 and 1 with the proportion of spots in the mosaic to cover with tiles of scale 1/4
tiles	a character vector with types of tiles to use for mosaic (default: `c("dr", "dl")`)
xlim	a numeric vector of length 2 giving the range of the x coordinates of the mosaic (ignored if argument `df` is an input)
ylim	a numeric vector of length 2 giving the range of the y coordinates of the mosaic (ignored if argument `df` is an input)

Value

An object of type `sf` with the tiles arranged as a mosaic

Note

For a discussion of multi-scale Truchet patterns see https://christophercarlson.com/portfolio/multi-scale-truchet-patterns/

Examples

```
mosaic <- st_truchet_ms()
plot(mosaic)
mosaic <- st_truchet_ms(p1 = 0.8, p2 = 0.16, p3 = 0.04)
plot(mosaic)
mosaic <- st_truchet_ms(p1 = 0.6, p2 = 0.3, p3 = 0.1, tiles = c("|", "-"))
plot(mosaic)
```

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st_truchet_p *Truchet tiles made with polygons*

Description

Truchet tiles made with polygons

Usage

```
st_truchet_p(x = 0, y = 0, type = "dl", scale_p = 1)
```

Arguments

x	A number with the x coordinate of the center of the tile
y	A number with the y coordinate of the center of the tile
type	A single character to designate a type of tile; currently supported options are "dl", "dr", "-", "|", "+.", "+", "x.", "tn", "fnw", "fne", "fsw", "fse", "ane", "asw"
scale_p	A number to designate the scale of the tile; currently supported options are 1, 1/2, and 1/4

Value

A list with one or more objects of type `sf` representing one or more tiles depending on type

Note

For a discussion of multi-scale Truchet patterns see https://christophercarlson.com/portfolio/multi-scale-truchet-patterns/

Examples

```
st_truchet_p(type = "-")
st_truchet_p(type = "fnw", scale_p = 1/2)
```

st_truchet_ss *Truchet mosaics*

Description

Truchet mosaics

Usage

```
st_truchet_ss(df = NULL, tiles = c("dr", "dl"), xlim = c(1, 3), ylim = c(1, 6))
```

Arguments

df	an (optional) data frame with the following columns: x and y (the coordinates of the tiles in a 1 by 1 grid), tiles (characters with types of tiles to use for mosaic), scale_p (the scale of the tile to be placed at each coordinate)
tiles	a character vector with types of tiles to use for mosaic (default: c("dr", "dl"))
xlim	a numeric vector of length 2 giving the range of the x coordinates of the mosaic (ignored if argument df is an input)
ylim	a numeric vector of length 2 giving the range of the y coordinates of the mosaic (ignored if argument df is an input)

Value

An object of type sf with the tiles arranged as a mosaic

Note

For a discussion of multi-scale Truchet patterns see https://christophercarlson.com/portfolio/multi-scale-truchet-patterns/

Examples

```
mosaic <- st_truchet_ss()
plot(mosaic)
mosaic <- st_truchet_ss(tiles = c("dl", "dr"))
plot(mosaic)
```

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