

Package ‘geozoo’

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Title Zoo of Geometric Objects

Description

Geometric objects defined in 'geozoo' can be simulated or displayed in the R package 'tourr'.

URL <http://schloerke.github.io/geozoo/>, <http://www.ggobi.org>,
<https://github.com/schloerke/geozoo>

BugReports <https://github.com/schloerke/geozoo/issues>

Depends R (>= 1.8.0)

Imports bitops, stats

Suggests tourr, roxygen2 (>= 5.0.0), testthat

License GPL-2

RoxygenNote 5.0.1

NeedsCompilation no

Author Barret Schloerke [aut, cre],
Di Cook [ths],
Hadley Wickham [ths]

Maintainer Barret Schloerke <schloerke@gmail.com>

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R topics documented:

boy.surface	2
conic.spiral	3
conic.spiral.nautilus	4
cross.cap	5
cross.polytope	5
cube.dotline	6
cube.face	7

cube.iterate	8
cube.solid.grid	8
cube.solid.random	9
dini.surface	10
ellipsoid	11
enneper.surface	12
f_composition	12
f_helmert	13
klein.fig.eight	14
mobius	15
mobius.experiment	15
print.geozoo	16
print.geozooNoScale	17
roman.surface	17
simplex	18
sphere.hollow	19
sphere.solid.grid	20
sphere.solid.random	20
torus	21
torus.flat	22
write.xml	23

Index 24

boy.surface	<i>Boy Surface</i>
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Description

A function to produce a Boy Surface.

Usage

```
boy.surface(n = 10000)
```

Arguments

n	number of points
---	------------------

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/mobius/other/>

Examples

```
## Generates a Boy Surface  
boy.surface(n = 1000)
```

conic.spiral	<i>Conic Spiral</i>
--------------	---------------------

Description

A function to produce a conic spiral

Usage

```
conic.spiral(n = 10000, a = 0.2, b = 1, c = 0.1, w = 2)
```

Arguments

n	number of points
a	final radius of cone
b	height of object
c	inner radius
w	number of spirals

Value

points	location of points
edges	edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/mobius/other/>

Examples

```
## Generates a Conic Spiral  
conic.spiral(n = 1000)
```

conic.spiral.nautilus *Conic Spiral (Nautilus Shape)*

Description

A function to produce a Conic Spiral in a nautilus shape

Usage

```
conic.spiral.nautilus(n = 10000, a = 0.2, b = 0.1, c = 0, w = 2)
```

Arguments

n	number of points
a	final radius of cone
b	height of object
c	inner radius
w	number of spirals

Value

points	location of points
edges	edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/mobius/other/>

Examples

```
## Generates a Nautilus Conic Spiral  
conic.spiral.nautilus( n = 1000 )
```

`cross.cap`*Cross Cap*

Description

A function to generate a cross cap

Usage

```
cross.cap(n = 10000)
```

Arguments

n number of points

Value

points location of points
edges edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/mobius/other/>

Examples

```
## Generates a Cross Cap  
cross.cap( n = 1000 )
```

`cross.polytope`*Cross Polytope*

Description

A function generate a cross polytope, cube dual, with vertices and a wire frame.

Usage

```
cross.polytope(p = 3)
```

Arguments

p dimension of object

Value

points location of points
edges edges of the object

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/cube/>

Examples

```
# Generates a 3-D Cross Polytope  
cross.polytope(p = 3)
```

cube.dotline

Cube with points along the wire frame

Description

A function to generate a cube with points on its face

Usage

```
cube.dotline(p = 3)
```

Arguments

p dimension of object

Value

points location of points
edges edges of the object

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/cube/>

Examples

```
## Generates a cube with points along its wire frame  
cube.dotline(p = 3)
```

cube.face	<i>Cube with points on the 'face'</i>
-----------	---------------------------------------

Description

A function to generate a cube with points on its face

Usage

```
cube.face(p = 3)
```

Arguments

p	dimension of object
---	---------------------

Value

points	location of points
edges	edges of the object

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/cube/>

Examples

```
## Generates a cube with points on its face  
cube.face(p = 3)
```

cube.iterate

Cube

Description

A function generate a cube with vertices and a wire frame

Usage

```
cube.iterate(p = 3)
```

Arguments

p dimension of object

Value

points location of points
edges edges of the object

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/cube/>

Examples

```
## Generates a cube  
cube.iterate(p = 3)
```

cube.solid.grid

Equidistant Solid Cube

Description

A function to generate a solid cube with equidistant points

Usage

```
cube.solid.grid(p = 3, n = 8)
```


Arguments

p dimension of object
n length of number of points in each dimension

Value

points location of points
edges edges of the object

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/cube/>

Examples

```
## Generates a solid cube with equidistant points  
cube.solid.grid(p = 3, n = 8)
```

cube.solid.random *Solid Cube*

Description

A function to generate a solid cube with random points

Usage

```
cube.solid.random(p = 3, n = 850 * (2^p))
```

Arguments

p dimension of object
n number of points

Value

points location of points
edges edges of the object

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/cube/>

Examples

```
## Generates a solid cube with random points
cube.solid.random(p = 3, n = 1000)
```

dini.surface	<i>Dini Surface</i>
--------------	---------------------

Description

A function to generate a dini surface.

Usage

```
dini.surface(n = 10000, a = 1, b = 1)
```

Arguments

n	number of points
a	outer radius of object
b	space between loops

Value

points	location of points
edges	edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/mobius/other/>

Examples

```
## Generates a Dini Surface
dini.surface(n = 1000, a = 1, b = 1)
```

`ellipsoid`*Ellipsoid*

Description

A function to generate an ellipsoid

Usage

```
ellipsoid(n = 10000, a = 1, b = 1, c = 3)
```

Arguments

n	number of points
a	radius in x direction
b	radius in y direction
c	radius in z direction

Value

points	location of points
edges	edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/mobius/other/>

Examples

```
## Generates an ellipsoid  
ellipsoid(n = 1000, a = 1, b = 1, c = 3)
```

enneper.surface	<i>Enneper's Surface</i>
-----------------	--------------------------

Description

A function to generate Enneper's surface

Usage

```
enneper.surface(n = 10000, a = 4)
```

Arguments

n	number of points
a	angle, radians, minimum and maximum. $-a < \text{angle} < a$

Value

points	location of points
edges	edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/mobius/other/>

Examples

```
## Generates an Enneper Surface
enneper.surface(n = 1000, a = 4)
```

f_composition	<i>f_composition</i>
---------------	----------------------

Description

Function to take a d-dimensional compositional data set and transform it using a Helmert transformation into (p-1)-space, where it lives. Mostly internally used, but could be useful for setting up new compositional data.

Usage

`f_composition(data)`

Arguments

`data` object

Value

`data` points in (d-1)-dimensional space

Author(s)

Di Cook

References

<http://schloerke.github.io/geozoo/simplices/>

`f_helmert` *f_helmert*

Description

Function to set up a Helmert transformation of a (d-1)-dimensional shape in p-space down into its (p-1)-space. Mostly internally used, but could be useful for setting up new compositional data.

Usage

`f_helmert(d)`

Arguments

`d` object

Value

`helmert` transformation matrix

Author(s)

Di Cook

References

<http://schloerke.github.io/geozoo/simplices/>

klein.fig.eight *Figure Eight Klein Bottle*

Description

A function to generate a figure eight Klein bottle

Usage

```
klein.fig.eight(n = 10000, a = 3, b = 1)
```

Arguments

n	number of points
a	radius of outer radius
b	radius of inner radius

Value

points	location of points
edges	edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/mobius/other/>

Examples

```
## Generates a figure eight Klein bottle.  
klein.fig.eight(n = 1000, a = 3, b = 1)
```

mobius	<i>Mobius</i>
--------	---------------

Description

A function to generate a mobius strip in the third or fourth dimension.

Usage

```
mobius(p = 3, n = 10000)
```

Arguments

p	dimension of object. (3)
n	number of points

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/mobius/mobius/>

Examples

```
## Generates a mobius strip.  
mobius(3, n = 1000)
```

mobius.experiment	<i>Mobius Experiment</i>
-------------------	--------------------------

Description

A function to generate a 5-D mobius strip in the third dimension.

Usage

```
mobius.experiment(p = 5, n = 10000)
```

Arguments

p	dimension of object. (5)
n	number of points

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/mobius/mobius/>

Examples

```
## Generates a mobius strip.  
mobius.experiment(5, n = 1000)
```

print.geozoo

Print

Description

Prints geozoo objects with tourr or prints them

Usage

```
## S3 method for class 'geozoo'  
print(x, ...)
```

Arguments

x	geozoo object
...	other arguements

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/>

Examples

```
## Not run:  
example(boy.surface)  
example(cube.face)  
  
## End(Not run)
```

print.geozooNoScale *Print Without Rescale*

Description

Prints objects without rescaling them to 0, 1 in each dim

Usage

```
## S3 method for class 'geozooNoScale'  
print(x, ...)
```

Arguments

x	geozoo object
...	other arguments

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/>

Examples

```
## Not run:  
torus()  
  
## End(Not run)
```

roman.surface *Roman Surface*

Description

A function to generate a Roman surface, also known as a Steiner surface

Usage

```
roman.surface(n = 10000, a = 1)
```

Arguments

n	number of points
a	maximum radius of object

Value

points	location of points
edges	edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/mobius/other/>

Examples

```
## Generates a Roman surface.  
roman.surface(n = 1000, a = 1)
```

simplex

Simplex

Description

A function to generate a simplex

Usage

```
simplex(p = 3)
```

Arguments

p	dimension of object
---	---------------------

Value

points	location of points
edges	edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/simplices/>

Examples

```
## Generates a simplex  
simplex(p = 3)
```

sphere.hollow	<i>Sphere</i>
---------------	---------------

Description

A function to generate a sphere with points on the surface

Usage

```
sphere.hollow(p = 3, n = p * 500)
```

Arguments

p	dimension of object
n	number of points

Value

points	location of points
edges	edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/sphere/>

Examples

```
## Generates a sphere with points on the surface  
sphere.hollow(p = 3, n = 1000)
```

sphere.solid.grid *Solid Sphere with Equidistant Points*

Description

A function to generate a solid sphere with equidistant points.

Usage

```
sphere.solid.grid(p = 3, n = 8)
```

Arguments

p	dimension of object
n	maximum number of points in the diameter

Value

points	location of points
edges	edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/sphere/>

Examples

```
## Generates a solid sphere with equidistant points  
sphere.solid.grid(p = 3, n = 8)
```

sphere.solid.random *Solid sphere with Random Points*

Description

A function to generate a solid sphere with random points

Usage

```
sphere.solid.random(p = 3, n = p * 500)
```

Arguments

p	dimension of object
n	number of points

Value

points	location of points
edges	edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/sphere/>

Examples

```
## Generates a solid sphere with random points.
sphere.solid.random(p = 3, n = 1000)
```

torus	<i>Torus</i>
-------	--------------

Description

A function to generate a torus in any dimension

Usage

```
torus(p = 3, n = 10000, radius = 2^((p - 2):0))
```

Arguments

p	dimension of object
n	number of points
radius	radiuses of the torus, set from largest to smallest

Value

points	location of points
edges	edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/mobius/torus/>

Examples

```
## Generates a torus
torus(p = 3, n = 1000)
```

torus.flat

Flat Torus

Description

A function to generate a flat torus in any dimension

Usage

```
torus.flat(p = 4, n = 10000)
```

Arguments

p	dimension of object (number of circles x2)
n	number of points

Value

points	location of points
edges	edges of the object (null)

Author(s)

Barret Schloerke

References

<http://schloerke.github.io/geozoo/mobius/torus/>

Examples

```
## Generates a Flat Torus
torus.flat(p = 4, n = 1000)
```

`write.xml`*Write XML File*

Description

A function that allows the user to write an object into an .xml.

Usage

```
write.xml(object.function, filepath, title)
```

Arguments

`object.function`

i.e. `cube()` or `sphere()`

`filepath`

where you would like to save the file in quotes

`title`

title of the file in quotes

Author(s)

Barret Schloerke

Index

* dynamic

- boy.surface, 2
 - conic.spiral, 3
 - conic.spiral.nautilus, 4
 - cross.cap, 5
 - cross.polytope, 5
 - cube.dotline, 6
 - cube.face, 7
 - cube.iterate, 8
 - cube.solid.grid, 8
 - cube.solid.random, 9
 - dini.surface, 10
 - ellipsoid, 11
 - enneper.surface, 12
 - klein.fig.eight, 14
 - mobius, 15
 - mobius.experiment, 15
 - print.geozoo, 16
 - print.geozooNoScale, 17
 - roman.surface, 17
 - simplex, 18
 - sphere.hollow, 19
 - sphere.solid.grid, 20
 - sphere.solid.random, 20
 - torus, 21
 - torus.flat, 22
 - write.xml, 23
-
- boy.surface, 2
 - conic.spiral, 3
 - conic.spiral.nautilus, 4
 - cross.cap, 5
 - cross.polytope, 5
 - cube.dotline, 6
 - cube.face, 7
 - cube.iterate, 8
 - cube.solid.grid, 8
 - cube.solid.random, 9
 - dini.surface, 10
 - ellipsoid, 11
 - enneper.surface, 12
 - klein.fig.eight, 14
 - mobius, 15
 - mobius.experiment, 15
 - print.geozoo, 16
 - print.geozooNoScale, 17
 - roman.surface, 17
 - simplex, 18
 - sphere.hollow, 19
 - sphere.solid.grid, 20
 - sphere.solid.random, 20
 - torus, 21
 - torus.flat, 22
 - write.xml, 23