

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

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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	<i>Cube with points along the wire frame</i>
--------------	--

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	<i>Solid Cube</i>
-------------------	-------------------

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	<i>Ellipsoid</i>
-----------	------------------

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

<i>f_helmert</i>

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	<i>Figure Eight Klein Bottle</i>
-----------------	----------------------------------

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`*Mobius*

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`*Mobius Experiment*

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 arguments

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	<i>Solid Sphere with Equidistant Points</i>
-------------------	---

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	<i>Solid sphere with Random Points</i>
---------------------	--

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

Torus

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	<i>Flat Torus</i>
------------	-------------------

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

<code>object.function</code>	i.e. <code>cube()</code> or <code>sphere()</code>
<code>filepath</code>	where you would like to save the file in quotes
<code>title</code>	title of the file in quotes

Author(s)

Barret Schloerke

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