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>

Repository CRAN

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R topics documented:

boy.surface   *Boy Surface*

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   *Conic Spiral*

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 *Cube with points on the 'face'*

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 *Dini Surface*

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   *Enneper's Surface*

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 < 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   *f_composition*

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   *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 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 arguements

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   *Sphere*

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   *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   *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

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