Package 'area'

May 7, 2026

Title Calculate Area of Triangles and Polygons

Version 0.2.0

Description Calculate the area of triangles and polygons using the shoelace formula. Area may be signed, taking into account path orientation, or unsigned, ignoring path orientation. The shoelace formula is described at <https://en.wikipedia.org/wiki/Shoelace_formula>.

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 7.2.3

Depends R (>= 4.1.0)

URL https://github.com/hypertidy/area

BugReports https://github.com/hypertidy/area/issues

LinkingTo cpp11

Suggests testthat

NeedsCompilation yes

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Repository CRAN

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mm *Planar straight line graphs and triangulations*

Description

A minimal mesh with one hole `mm` and a map of Tasmania with multiple holes in planar straight line graph format from the RTriangle package.

Details

`mm_tri` is a triangulated form of `mm` in RTriangle `triangulation` format. The HOLE property is not yet set WIP.

Examples

```
str(mm)
```

polygon_area *Area of polygon*

Description

Calculate polygon area from a matrix of a closed polygon. Closed means that the first coordinate is the same as the last.

Usage

```
polygon_area(x, signed = FALSE)
```

Arguments

`x`	polygon in xy matrix
`signed`	defaults to `FALSE` and absolute value of area is returned

Details

Only one polygon can be input. We are using the normal definition of polygon which is a plane figure described by straight line segments.

Currently inputs are not checked but are assumed to have the last coordinate as a copy of the first aka 'closed'.

If `signed = FALSE` the absolute value of area is returned, otherwise the sign reflects path orientation. Positive means counter-clockwise orientation.

The algorithm used was once on the internet at "w w w .cs.tufts.edu/comp/163/OrientationTests.pdf"

Value

numeric vector of area

Examples

```
x <- c(2, 10, 8, 11, 7, 2)
y <- c(7, 1,  6, 7, 10, 7)
polygon_area(cbind(x, y), signed = TRUE)
xy <-
 cbind(x = c(2.3, 1.5, 2.4, 4.5, 4.6, 5.4, 7.6, 8.6, 7.4, 5.1, 2.3),
       y = c(-1.4, 7.3, 22.2, 22.5, 14.4, 11.8, 16.4, 5, 0.8, -1.6, -1.4))
polygon_area(xy)
## xy is clockwise so area is negative
polygon_area(xy, signed = TRUE)
polygon_area(xy[nrow(xy):1, ], signed = TRUE)

## Rosetta code example
## https://rosettacode.org/wiki/Shoelace_formula_for_polygonal_area

m <- rbind(c(3,4), c(5,11), c(12,8), c(9,5), c(5,6))
p <- m[c(1:nrow(m), 1), ]  ## close it
polygon_area(p)
```

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triangle_area *Area of triangles*

Description

Calculate triangle area from a matrix of coordinates. Triangles are composed of three coordinates, so the matrix should have this as triplets of rows one after the other.

Usage

```
triangle_area(x, signed = FALSE)
```

Arguments

x	coordinates x,y triplets matrix where 'nrow(x) = ntriangles*3'
signed	defaults to FALSE and absolute value of area is returned, if TRUE negative means clockwise 'p->q->r' turns right and positive means counter-clockwise 'p->q->r' turns left

Details

If signed = FALSE the absolute value of area is returned, otherwise the sign reflects path orientation. Positive means counter-clockwise orientation.

The algorithm was once documented at 'w w w cs.tufts.edu/comp/163/OrientationTests.pdf'

Value

numeric vector of area

Examples

```
sum(triangle_area(mm_tri$P[t(mm_tri$T), ]))
```

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