Package 'sfheaders'

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Type Package

Title Converts Between R Objects and Simple Feature Objects

Date 2024-01-18

Version 0.4.4

Description Converts between R and Simple Feature 'sf' objects, without depending on the Simple Feature library. Conversion functions are available at both the R level, and through 'Rcpp'.

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URL https://dcooley.github.io/sfheaders/

BugReports https://github.com/dcooley/sfheaders/issues

Encoding UTF-8

RoxygenNote 7.2.3

Depends R (>= 3.0.2)

LinkingTo geometries (>= 0.2.4), Rcpp

Imports Rcpp (>= 1.0.10)

Suggests covr, knitr, testthat

NeedsCompilation yes

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Repository CRAN

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Contents

`sfc_cast` *sfc cast*

Description

convert the input `sfc` to a different geometry

Usage

```
sfc_cast(sfc, to, close = TRUE)
```

Arguments

`sfc`	geometry object to convert to a different geometry
`to`	the geometry to convert to.
`close`	logical indicating if polygons should be closed

Examples

```
df <- data.frame(
 id1 = c(1,1,1,1,1,1,1,1,2,2,2,2)
 , id2 = c(1,1,1,1,2,2,2,2,1,1,1,1)
 , x = c(0,0,1,1,1,1,2,2,3,4,4,3)
 , y = c(0,1,1,0,1,2,2,1,3,3,4,4)
)

pt <- sfc_point(obj = df, x = "x", y = "y", z = "id1")
mpt <- sfc_multipoint(obj = df, x = "x", y = "y", multipoint_id = "id1")
ls <- sfc_linestring(obj = df, x = "x", y = "y", linestring_id = "id1")
mls <- sfc_multilinestring(obj = df, x = "x", y = "y", multilinestring_id = "id1")
p <- sfc_polygon(
  obj = df
  , x = "x"
  , y = "y"
  , polygon_id = "id1"
  , linestring_id = "id2"
  , close = FALSE
  )
mp <- sfc_multipolygon(
  obj = df
  , x = "x"
  , y = "y"
  , multipolygon_id = "id1"
  , linestring_id = "id2"
  , close = FALSE
)

sfc_cast( pt, "LINESTRING" )
sfc_cast( mpt, "POLYGON" )
sfc_cast( ls, "POINT" )
sfc_cast( mls, "MULTIPOLYGON" )
sfc_cast( p, "POINT" )
sfc_cast( mp, "LINESTRING" )
```

---

sfc_linestring *sfc LINESTRING*

Description

constructs sfc of LINESTRING objects

Usage

```
sfc_linestring(
  obj = NULL,
  x = NULL,
```

```
  y = NULL,
  z = NULL,
  m = NULL,
  linestring_id = NULL
)
```

Arguments

obj	sorted matrix or data.frame
x	x geometry column
y	y geometry column
z	z geometry column
m	m geometry column
linestring_id	column of ids for linestrings

Value

sfc object of LINESTRING geometries

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Examples

```
x <- matrix( c(1:4), ncol = 2 )
sfc_linestring( x )

x <- data.frame( id = 1:2, x = 1:2, y = 2:1 )
sfc_linestring( x )
sfc_linestring( x, x = "x", y = "y" )
sfc_linestring( x, x = "y", y = "x" )
sfc_linestring( x, linestring_id = "id", x = "x", y = "y")

df <- data.frame(
  id = c(1,1,1,1,2,2,2)
  , x = 1:7
  , y = 7:1
  , z = 14:8
  , m = 8:14
)

sfc_linestring(df, x = "x", y = "y", linestring_id = "id")
sfc_linestring(df, x = "x", y = "y", z = "z", linestring_id = "id")
sfc_linestring(df, x = "x", y = "y", m = "m", linestring_id = "id")
sfc_linestring(df, x = "x", y = "y", z = "z", m = "m", linestring_id = "id")
```

`sfc_multilinestring` *sfc MULTILINESTRING*

Description

constructs an sfc of MULTILINESTRING objects

Usage

```
sfc_multilinestring(
  obj = NULL,
  x = NULL,
  y = NULL,
  z = NULL,
  m = NULL,
  multilinestring_id = NULL,
  linestring_id = NULL
)
```

Arguments

`obj`	sorted matrix or data.frame
`x`	x geometry column
`y`	y geometry column
`z`	z geometry column
`m`	m geometry column
`multilinestring_id`	column of ids for multilinestrings
`linestring_id`	column of ids for linestrings (within multilinestrings)

Value

`sfc` object of MULTILINESTRING geometries

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Examples

```
m <- matrix(c(0,0,0,0,1,1), ncol = 3 )
sfc_multilinestring( m )

m <- matrix(c(0,0,0,0,0,1,0,1,1,1,2,2,1,2,3), ncol = 3, byrow = TRUE)
sfc_multilinestring( obj = m )
sfc_multilinestring( obj = m, multilinestring_id = 1 )
sfc_multilinestring( obj = m, linestring_id = 1 )

sfc_multilinestring( obj = m, linestring_id = 1, multilinestring_id = 1 )

sfc_multilinestring( obj = m, x = 2, y = 3 )
sfc_multilinestring( obj = m, x = 1, y = 2, z = 3 )
sfc_multilinestring( obj = m, x = 2, y = 3, linestring_id = 1, multilinestring_id = 1 )

df <- data.frame(
  ml_id = c(1,1,1,1,1,1,1,2,2,2,2,2)
  , l_id = c(1,1,1,2,2,3,3,3,1,1,1,2,2)
  , x = rnorm(13)
  , y = rnorm(13)
  , z = rnorm(13)
  , m = rnorm(13)
)

sfc_multilinestring( obj = df, x = "x", y = "y")
sfc_multilinestring( obj = df, x = "x", y = "y", z = "z")
sfc_multilinestring( obj = df, x = "x", y = "y", z = "z", m = "m")

sfc_multilinestring( obj = df, x = 2, y = 3)
sfc_multilinestring( obj = df, x = 2, y = 3, z = 4)
sfc_multilinestring( obj = df, x = 2, y = 3, z = 4, m = 5)

sfc_multilinestring( obj = df, multilinestring_id = "ml_id", linestring_id = "l_id" )
sfc_multilinestring( obj = df, multilinestring_id = 1, linestring_id = 2 )
```

`sfc_multipoint` *sfc MULTIPOINT*

Description

constructs sfc of MULTIPOINT objects

Usage

```
sfc_multipoint(
  obj,
```

```
  x = NULL,
  y = NULL,
  z = NULL,
  m = NULL,
  multipoint_id = NULL
)
```

Arguments

obj	sorted matrix or data.frame
x	x geometry column
y	y geometry column
z	z geometry column
m	m geometry column
multipoint_id	column of ids for multipoints

Value

sfc object of MULTIPOINT geometries

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Examples

```
x <- matrix( c(1:4), ncol = 2 )
sfc_multipoint( x )

x <- data.frame( id = 1:2, x = 1:2, y = 2:1 )
sfc_multipoint( x )
sfc_multipoint( x, x = "x", y = "y" )
sfc_multipoint( x, x = "y", y = "x" )
sfc_multipoint( x, multipoint_id = "id", x = "x", y = "y")
```

---

sfc_multipolygon *sfc MULTIPOLYGON*

Description

constructs an sfc of MULTIPOLYGON objects

Usage

```
sfc_multipolygon(
  obj = NULL,
  x = NULL,
  y = NULL,
  z = NULL,
  m = NULL,
  multipolygon_id = NULL,
  polygon_id = NULL,
  linestring_id = NULL,
  close = TRUE
)
```

Arguments

obj	sorted matrix or data.frame
x	x geometry column
y	y geometry column
z	z geometry column
m	m geometry column
multipolygon_id	column of ids for multipolygons
polygon_id	column of ids for polygons
linestring_id	column of ids for lines (within polygons)
close	logical indicating whether polygons should be closed. If TRUE, all polygons will be checked and force closed if possible

Value

sfc object of MULTIPOLYGON geometries

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Examples

```
m <- matrix(c(0,0,0,0,1,0,0,1,1,0,0,1,0,0,0), ncol = 3, byrow = TRUE )
sfc_multipolygon( m )

df <- data.frame(
  id = c(1,1,1,1,1)
  , x = c(0,0,1,1,0)
  , y = c(0,1,1,0,0)
)
```

```
sfc_multipolygon( df, x = "x", y = "y" )

df <- data.frame(
  id = c(1,1,1,1,1,2,2,2,2,2)
  , x = c(0,0,1,1,0,1,1,2,2,1)
  , y = c(0,1,1,0,0,1,2,2,1,1)
)

sfc_multipolygon( df, multipolygon_id = "id", polygon_id = "id", linestring_id = "id")

df <- data.frame(
  id1 = c(1,1,1,1,1,1,1,1,1,1)
  , id2 = c(1,1,1,1,1,2,2,2,2,2)
  , x = c(0,0,1,1,0,1,1,2,2,1)
  , y = c(0,1,1,0,0,1,2,2,1,1)
)

sfc_multipolygon( df, multipolygon_id = "id1", polygon_id = "id2")

df <- data.frame(
  id1 = c(1,1,1,1,1,1,1,1,1,1,2,2,2,2,2)
  , id2 = c(1,1,1,1,1,2,2,2,2,2,1,1,1,1,1)
  , x = c(0,0,1,1,0,1,1,2,2,1,3,3,4,4,3)
  , y = c(0,1,1,0,0,1,2,2,1,1,3,4,4,3,3)
)

sfc_multipolygon( df, multipolygon_id = "id1", polygon_id = "id2")

df <- data.frame(
  id1 = c(1,1,1,1,1,2,2,2,2,2)
  , id2 = c(1,1,1,1,1,1,1,1,1,1)
  , x = c(0,0,1,1,0,1,1,2,2,1)
  , y = c(0,1,1,0,0,1,2,2,1,1)
)

sfc_multipolygon( df, multipolygon_id = "id1", polygon_id = "id2" )
sfc_multipolygon( df, polygon_id = "id1", linestring_id = "id2" )
sfc_multipolygon( df, x = "x", y = "y", polygon_id = "id1")
sfc_multipolygon( df, x = "x", y = "y", polygon_id = "id1", linestring_id = "id2")
sfc_multipolygon( df, x = "x", y = "y", linestring_id = "id1")
sfc_multipolygon( df, x = "x", y = "y", linestring_id = "id2")

df <- data.frame(
  id1 = c('a','a','a','a','a','b','b','b','b','b')
  , id2 = c(1,1,1,1,1,1,1,1,1,1)
  , x = c(0,0,1,1,0,1,1,2,2,1)
  , y = c(0,1,1,0,0,1,2,2,1,1)
)

sfc_multipolygon( df, x = "x", y = "y", polygon_id = "id1")
```

`sfc_point` *sfc POINT*

Description

constructs sfc of POINT objects

Usage

```
sfc_point(obj, x = NULL, y = NULL, z = NULL, m = NULL)
```

Arguments

`obj`	sorted vector, matrix or data.frame
`x`	x geometry column
`y`	y geometry column
`z`	z geometry column
`m`	m geometry column

Value

`sfc` object of POINT geometries

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Examples

```
x <- c(1:3)
sfc_point( x )

x <- matrix( c(1:10) , ncol = 2 )
sfc_point( x )

x <- setNames( as.data.frame( x ), c("x","y") )
sfc_point( x )
sfc_point( obj = x, x = "x", y = "y" )
sfc_point( obj = x, x = "y", y = "x" )
```

`sfc_polygon` *sfc POLYGON*

Description

constructs an sfc of POLYGON objects

Usage

```
sfc_polygon(
  obj = NULL,
  x = NULL,
  y = NULL,
  z = NULL,
  m = NULL,
  polygon_id = NULL,
  linestring_id = NULL,
  close = TRUE
)
```

Arguments

`obj`	sorted matrix or data.frame
`x`	x geometry column
`y`	y geometry column
`z`	z geometry column
`m`	m geometry column
`polygon_id`	column of ids for polygons
`linestring_id`	column of ids for lines (within polygons)
`close`	logical indicating whether polygons should be closed. If `TRUE`, all polygons will be checked and force closed if possible

Value

`sfc` object of POLYGON geometries

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Examples

```
m <- matrix(c(0,0,0,0,1,1), ncol = 2 )
sfc_polygon( m )

m <- matrix(c(0,0,0,0,0,1,0,1,1,1,2,2,1,2,3,1,3,2), ncol = 3, byrow = TRUE)
sfc_polygon( obj = m )
sfc_polygon( obj = m, polygon_id = 1 )
sfc_polygon( obj = m, linestring_id = 1 )

sfc_polygon( obj = m, linestring_id = 1, polygon_id = 1 )

sfc_polygon( obj = m, x = 2, y = 3 )
sfc_polygon( obj = m, x = 1, y = 2, z = 3 )
sfc_polygon( obj = m, x = 2, y = 3, linestring_id = 1, polygon_id = 1 )

df <- data.frame(
  ml_id = c(1,1,1,1,1,1,1,1,2,2,2,2,2,2)
  , l_id = c(1,1,1,2,2,2,3,3,3,1,1,1,2,2,2)
  , x = rnorm(15)
  , y = rnorm(15)
  , z = rnorm(15)
  , m = rnorm(15)
)

sfc_polygon( obj = df, x = "x", y = "y")
sfc_polygon( obj = df, x = "x", y = "y", z = "z")
sfc_polygon( obj = df, x = "x", y = "y", z = "z", m = "m")

sfc_polygon( obj = df, x = 2, y = 3)
sfc_polygon( obj = df, x = 2, y = 3, z = 4)
sfc_polygon( obj = df, x = 2, y = 3, z = 4, m = 5)

sfc_polygon( obj = df, polygon_id = "ml_id", linestring_id = "l_id" )
sfc_polygon( obj = df, polygon_id = 1, linestring_id = 2 )
```

`sfc_to_df` *sfc to df*

Description

Converts an sfc object to a data.frame

Usage

```
sfc_to_df(sfc)
```

Arguments

sfc	sfc object

Examples

```
x <- matrix( c(1:16), ncol = 2 )
sfc <- sfc_linestring( x )
df <- sfc_to_df( sfc )

df <- data.frame(
ml_id = c(1,1,1,1,1,1,1,1,2,2,2,2,2)
, l_id = c(1,1,1,2,2,3,3,3,1,1,1,2,2)
, x = rnorm(13)
, y = rnorm(13)
, z = rnorm(13)
, m = rnorm(13)
)
sfc <- sfc_multilinestring( obj = df, multilinestring_id = "ml_id", linestring_id = "l_id" )

df <- sfc_to_df( sfc )
```

---

sfg_linestring *sfg linestring*

Description

constructs sfg LINESTRING object

Usage

```
sfg_linestring(obj, x = NULL, y = NULL, z = NULL, m = NULL)
```

Arguments

obj	matrix or data.frame
x	x geometry column
y	y geometry column
z	z geometry column
m	m geometry column

Value

sfg object of LINESTRING geometry

Examples

```
sfg_linestring( 1:2 )
sfg_linestring( 1:3 )
sfg_linestring( 1:4 )

sfg_linestring( matrix( 1:24, ncol = 2 ) )
sfg_linestring( matrix( 1:24, ncol = 3 ) )
sfg_linestring( matrix( 1:24, ncol = 4 ) )

sfg_linestring( matrix( 1:24, ncol = 4 ), x = 3, y = 2, z = 3)

sfg_linestring( data.frame( x = 1:10, y = 11:20 ) )
sfg_linestring( data.frame( x = 1:10, y = 11:20, z = 21:30 ) )
sfg_linestring( data.frame( x = 1:10, y = 11:20, z = 21:30 ), x = "x", y = "z" )
```

---

sfg_multilinestring *sfg multilinestring*

Description

constructs sfg MULTILINESTRING object

Usage

```
sfg_multilinestring(
  obj,
  x = NULL,
  y = NULL,
  z = NULL,
  m = NULL,
  linestring_id = NULL
)
```

Arguments

obj	matrix or data.frame
x	x geometry column
y	y geometry column
z	z geometry column
m	m geometry column
linestring_id	column of ids for lines

Value

sfg object of MULTILINESTRING geometry

Examples

```
sfg_multilinestring( matrix( 1:24, ncol = 2 ) )
sfg_multilinestring( matrix( 1:24, ncol = 3 ) )
sfg_multilinestring( matrix( 1:24, ncol = 4 ) )

## different lines
m <- cbind( matrix( 1:24, ncol = 2 ), c(rep(1, 6), rep(2, 6) ) )
sfg_multilinestring( obj = m, x = 1, y = 2, linestring_id = 3 )

## just specifying linestring_id will use all others as the geometries
sfg_multilinestring( obj = m, linestring_id = 3 )

df <- data.frame( x = 1:12, y = 1:12, z = 13:24, id = c(rep(1,6), rep(2,6)))
sfg_multilinestring( df, x = "x", y = "y" )
sfg_multilinestring( df, x = "x", y = "y", linestring_id = "id" )

sfg_multilinestring( df, linestring_id = "id" )
```

`sfg_multipoint` *sfg multipoint*

Description

constructs sfg MULTIPOINT object

Usage

```
sfg_multipoint(obj, x = NULL, y = NULL, z = NULL, m = NULL)
```

Arguments

`obj`	matrix or data.frame
`x`	x geometry column
`y`	y geometry column
`z`	z geometry column
`m`	m geometry column

Value

`sfg` object of MULTIPOINT geometry

Examples

```
sfg_multipoint( 1:2 )
sfg_multipoint( 1:3 )
sfg_multipoint( 1:4 )

sfg_multipoint( matrix( 1:3, ncol = 3 ) )
sfg_multipoint( data.frame( x = 1, y = 2, z = 3 )  )

sfg_multipoint( matrix( 1:4, ncol = 2 ) )
sfg_multipoint( matrix( 1:24, ncol = 2, byrow = TRUE ) )
sfg_multipoint( matrix( 1:24, ncol = 3, byrow = TRUE ) )
sfg_multipoint( matrix( 1:24, ncol = 4, byrow = TRUE ) )

sfg_multipoint( data.frame( x = 1:5, y = 1:5 ) )

## using columns

sfg_multipoint( matrix( 1:24, ncol = 4, byrow = TRUE ), x = 1, y = 2 )
sfg_multipoint( matrix( 1:24, ncol = 4, byrow = TRUE ), x = 1, y = 2, z = 3 )
sfg_multipoint( matrix( 1:24, ncol = 4, byrow = TRUE ), x = 3, y = 4 )

df <- data.frame( x = 1:5, y = 1:5, z = 11:15, m = 11:15 )
sfg_multipoint( df, x = "x", y = "y" )
sfg_multipoint( df, x = "x", y = "y", z = "z" )
sfg_multipoint( df, x = "x", y = "y", z = "z", m = "m" )
```

---

sfg_multipolygon *sfg multipolygon*

Description

constructs sfg MULTIPOLYGON object

Usage

```
sfg_multipolygon(
  obj,
  x = NULL,
  y = NULL,
  z = NULL,
  m = NULL,
  polygon_id = NULL,
  linestring_id = NULL,
  close = TRUE
)
```

Arguments

obj	matrix or data.frame
x	x geometry column
y	y geometry column
z	z geometry column
m	m geometry column
polygon_id	column of ids for polygons (within the multipolygon)
linestring_id	column of ids for lines (within polygons)
close	logical indicating whether polygons should be closed. If TRUE, all polygons will be checked and force closed if possible

Value

sfg object of MULTIPOLYGON geometry

Examples

```
df <- data.frame(
  polygon_id = c(rep(1, 5), rep(2, 10))
  , line_id = c(rep(1, 10), rep(2, 5))
  , x = c(0,0,1,1,0,2,2,5,5,2,3,3,4,4,3)
  , y = c(0,1,1,0,0,2,5,5,2,2,3,4,4,3,3)
  , z = c(1)
  , m = c(1)
)

m <- as.matrix( df )

sfg_multipolygon( df[, c("x","y") ] )

sfg_multipolygon(
  df, x = "x", y = "y", polygon_id = "polygon_id", linestring_id = "line_id"
  )
sfg_multipolygon(
  df, x = "x", y = "y", z = "z", polygon_id = "polygon_id", linestring_id = "line_id"
  )
sfg_multipolygon(
 df, x = "x", y = "y", z = "z", m = "m", polygon_id = "polygon_id", linestring_id = "line_id"
  )


sfg_multipolygon( m[, c("x","y") ] )

sfg_multipolygon(
  m, x = "x", y = "y", polygon_id = "polygon_id", linestring_id = "line_id"
  )
sfg_multipolygon(
  m, x = "x", y = "y", z = "z", polygon_id = "polygon_id", linestring_id = "line_id"
  )
```

```
sfg_multipolygon(
 m, x = "x", y = "y", z = "z", m = "m", polygon_id = "polygon_id", linestring_id = "line_id"
  )
```

`sfg_point` *sfg point*

Description

constructs sfg POINT object

Usage

```
sfg_point(obj, x = NULL, y = NULL, z = NULL, m = NULL)
```

Arguments

`obj`	matrix or data.frame
`x`	x geometry column
`y`	y geometry column
`z`	z geometry column
`m`	m geometry column

Value

`sfg` object of POINT geometry

Examples

```
sfg_point( 1:2 )
sfg_point( 1:3 )
sfg_point( 1:4 )

sfg_point( matrix( 1:3, ncol = 3 ) )
sfg_point( data.frame( x = 1, y = 2, z = 3 )  )

sfg_point( data.frame( x = 1, y = 2, z = 3 ), x = "x", y = "y" )
sfg_point( data.frame( x = 1, y = 2, z = 3 ), x = 1, y = 3  )
```

sfg_polygon *sfg polygon*

Description

constructs sfg POLYGON object

Usage

```
sfg_polygon(
  obj,
  x = NULL,
  y = NULL,
  z = NULL,
  m = NULL,
  linestring_id = NULL,
  close = TRUE
)
```

Arguments

obj	matrix or data.frame
x	x geometry column
y	y geometry column
z	z geometry column
m	m geometry column
linestring_id	column of ids for lines (within polygons)
close	logical indicating whether polygons should be closed. If TRUE, all polygons will be checked and force closed if possible

Value

sfg object of POLYGON geometry

Examples

```
sfg_polygon( matrix( 1:24, ncol = 2 ) )
sfg_polygon( matrix( 1:24, ncol = 3 ) )
sfg_polygon( matrix( 1:24, ncol = 4 ) )

## different lines
m <- cbind( matrix( 1:24, ncol = 2 ), c(rep(1, 6), rep(2, 6) ) )
sfg_polygon( obj = m, x = 1, y = 2, linestring_id = 3 )

## just specifying linestring_id will use all others as the geometries
sfg_polygon( obj = m, linestring_id = 3 )
```

```
df <- data.frame( x = 1:12, y = 1:12, z = 13:24, id = c(rep(1,6), rep(2,6)))
sfg_polygon( df, x = "x", y = "y" )
sfg_polygon( df, x = "x", y = "y", linestring_id = "id" )

sfg_polygon( df, linestring_id = "id" )
```

---

sfg_to_df *sfg to df*

Description

Converts an sfg object to a data.frame

Usage

```
sfg_to_df(sfg)
```

Arguments

sfg	sfg object

Examples

```
sfg <- sfg_point( obj = c(1,2) )
df <- sfg_to_df( sfg )

m <- cbind( matrix( 1:24, ncol = 2 ), c(rep(1, 6), rep(2, 6) ) )
sfg <- sfg_polygon( obj = m, x = 1, y = 2, linestring_id = 3 )
df <- sfg_to_df( sfg )
```

---

sf_bbox *sf bbox*

Description

Calculates the bounding box of coordinates. This does not read the "bbox" attribute, it re-calculates the bounding box from the geometry coordinates

Usage

```
sf_bbox(obj, x = NULL, y = NULL)
```

Arguments

obj	matrix, data.frame, sfg, sfc or sf object.
x	x geometry column
y	y geometry column

Examples

```
## data.frame
df <- data.frame(
 id1 = c(1,1,1,1,1,1,1,1,2,2,2,2)
 , id2 = c(1,1,1,1,2,2,2,2,1,1,1,1)
 , x = c(0,0,1,1,1,1,2,2,3,4,4,3)
 , y = c(0,1,1,0,1,2,2,1,3,3,4,4)
)

sf_bbox( obj = df[, c("x","y")] )
sf_bbox( obj = df, x = "x", y = "y" )

## sfg objects
pt <- sfg_point(obj = df[1, ], x = "x", y = "y", z = "id1")
mpt <- sfg_multipoint(obj = df, x = "x", y = "y")
ls <- sfg_linestring(obj = df, x = "x", y = "y")
mls <- sfg_multilinestring(obj = df, x = "x", y = "y")
p <- sfg_polygon(obj = df, x = "x" , y = "y")
mp <- sfg_multipolygon(obj = df, x = "x", y = "y", close = FALSE )

sf_bbox( pt )
sf_bbox( mpt )
sf_bbox( ls )
sf_bbox( mls )
sf_bbox( p )
sf_bbox( mp )

## sfc objects
pt <- sfc_point(obj = df, x = "x", y = "y", z = "id1")
mpt <- sfc_multipoint(obj = df, x = "x", y = "y", multipoint_id = "id1")
ls <- sfc_linestring(obj = df, x = "x", y = "y", linestring_id = "id1")
mls <- sfc_multilinestring(obj = df, x = "x", y = "y", multilinestring_id = "id1")
p <- sfc_polygon(
  obj = df
  , x = "x"
  , y = "y"
  , polygon_id = "id1"
  , linestring_id = "id2"
  , close = FALSE
  )
mp <- sfc_multipolygon(
  obj = df
  , x = "x"
  , y = "y"
  , multipolygon_id = "id1"
```

```
  , linestring_id = "id2"
  , close = FALSE
  )

sf_bbox( pt )
sf_bbox( mpt )
sf_bbox( ls )
sf_bbox( mls )
sf_bbox( p )
sf_bbox( mp )

## sf objects
pt <- sf_point(obj = df, x = "x", y = "y", z = "id1")
mpt <- sf_multipoint(obj = df, x = "x", y = "y", multipoint_id = "id1")
ls <- sf_linestring(obj = df, x = "x", y = "y", linestring_id = "id1")
mls <- sf_multilinestring(obj = df, x = "x", y = "y", multilinestring_id = "id1")
p <- sf_polygon(
  obj = df
  , x = "x"
  , y = "y"
  , polygon_id = "id1"
  , linestring_id = "id2"
  , close = FALSE
  )
mp <- sf_multipolygon(
  obj = df
  , x = "x"
  , y = "y"
  , multipolygon_id = "id1"
  , linestring_id = "id2"
  , close = FALSE
  )

sf_bbox( pt )
sf_bbox( mpt )
sf_bbox( ls )
sf_bbox( mls )
sf_bbox( p )
sf_bbox( mp )

## you can use it to update a bounding-box if it gets corrupted
attr( mpt, "bbox" ) <- c(1:5)
mpt ## incorrect values
attr( mpt, "bbox" ) <- sf_bbox( mpt )
mpt ## back to correct values
```

---

sf_boxes *sf boxes*

Description

returns the bounding box of each geometry

Usage

```
sf_boxes(obj)
```

Arguments

obj	sf, sfc or sfg object

Examples

```
df <- data.frame(
 id1 = c(1,1,1,1,1,1,1,1,2,2,2,2)
 , id2 = c(1,1,1,1,2,2,2,2,1,1,1,1)
 , x = c(0,0,1,1,1,1,2,2,3,4,4,3)
 , y = c(0,1,1,0,1,2,2,1,3,3,4,4)
)

sf_line <- sfheaders::sf_linestring(
  obj = df
  , x = "x"
  , y = "y"
  , linestring_id = "id1"
)

sf_boxes( sf_line )
```

`sf_cast` *sf cast*

Description

convert the input `sf` to a different geometry

Usage

```
sf_cast(sf, to, close = TRUE, list_columns = NULL)
```

Arguments

sf	object to convert
to	the geometry to convert to.
close	logical indicating if polygons should be closed
list_columns	vector of column names or indexes. List columns are columns of data where there is a value corresponding to each coordinate in the geometry (sfc). List columns get cast with the geometries.

Examples

```
df <- data.frame(
 id1 = c(1,1,1,1,1,1,1,1,2,2,2,2)
 , id2 = c(1,1,1,1,2,2,2,2,1,1,1,1)
 , x = c(0,0,1,1,1,1,2,2,3,4,4,3)
 , y = c(0,1,1,0,1,2,2,1,3,3,4,4)
)

pt <- sf_point(obj = df, x = "x", y = "y", z = "id1")
mpt <- sf_multipoint(obj = df, x = "x", y = "y", multipoint_id = "id1")
ls <- sf_linestring(obj = df, x = "x", y = "y", linestring_id = "id1")
mls <- sf_multilinestring(obj = df, x = "x", y = "y", multilinestring_id = "id1")
p <- sf_polygon(
  obj = df
  , x = "x"
  , y = "y"
  , polygon_id = "id1"
  , linestring_id = "id2"
  , close = FALSE
  )
mp <- sf_multipolygon(
  obj = df
  , x = "x"
  , y = "y"
  , multipolygon_id = "id1"
  , linestring_id = "id2"
  , close = FALSE
  )

sf_cast( pt, "LINESTRING" )
sf_cast( mpt, "POLYGON" )
sf_cast( ls, "POINT" )
sf_cast( mls, "MULTIPOLYGON" )
sf_cast( p, "POINT" )
sf_cast( mp, "LINESTRING" )


## List Columns

df <- data.frame(
 id1 = c(1,1,1,1,1,1,1,1,2,2,2,2)
 , id2 = c(1,1,1,1,2,2,2,2,1,1,1,1)
 , x = c(0,0,1,1,1,1,2,2,3,4,4,3)
 , y = c(0,1,1,0,1,2,2,1,3,3,4,4)
)

## Add a column where each value is an attribute of each coordinate
df$val <- letters[1:nrow(df)]

## Make a multipolygon, and specify `val` as a list_column
mp <- sf_multipolygon(
  obj = df
```

```
  , x = "x"
  , y = "y"
  , multipolygon_id = "id1"
  , linestring_id = "id2"
  , list_column = "val"
  , keep = TRUE
  , close = FALSE
  )

## The 'val' attributes follow the same structure as the geometry column
## So each 'val' corresponds to a single coordinate in the geometry
str( mp )

## specifying `list_columns = "val"` when casting will retain the association
## between the 'val' attribute and each coordinate.
res <- sf_cast( mp, "LINESTRING", list_columns = "val" )

## The 'val' attribute still follows the same structure as the geometry column
str( res )
```

`sf_line` *Helper for sf LINESTRING*

Description

Constructs sf of LINESTRING objects, a helper for `sf_linestring()` with a simpler syntax.

Usage

```
sf_line(obj, keep = FALSE, list_columns = NULL)
```

Arguments

`obj`	sorted matrix or data.frame
`keep`	logical indicating if the non-geometry and non-id columns should be kept. if TRUE you must supply the geometry and id columns, and only the first row of each geometry is kept. See Keeping Properties.
`list_columns`	vector of column names to turn into a list.

Value

`sf` object of LINESTRING geometries

Helpers

These are simpler versions of the main functions `sf_point()`, `sf_multipoint()`, `sf_linestring()`, `sf_multilinestring()`, `sf_polygon()`, and `sf_multipolygon()` for input data frame or matrix that contains columns appropriately of 'x', 'y', 'z', 'm', ' multipolygon_id', polygon_id', 'multi-linestring_id', 'linestring_id', 'multipoint_id'.

This puts the onus of the naming and identification of entities onto the input data set, rather than when calling the creator function. This has pros and cons, so is not necessarily always 'simpler'. Please choose the appropriate constructor for the context you have. For examples a data frame from the real world with columns 'lon', 'lat', 'line' will be best used with

```
sf_linestring(df, x = "lon", y = "lat", linestring_id = "line")
```

whereas a heavy user of sfheaders might always create a data frame with 'x', 'y', 'linestring_id' precisely because they are expecting to call `sf_line(df)` and no further work is required. These are very different contexts and both equally valid.

Some columns are mandatory, such as 'x' and 'y' (always), while others depend on the output type where each column for that type is mandatory. The 'z' and/or 'm' values are included for 'XYZ', 'XYM', or 'XYZM' geometry types if and as they are present.

In summary these helpers:

- do not require arguments declaring column names.
- use assumed default column names, with no variation or absence allowed for a given type.
- use `z`, and/or `m` if present.
- use `close = FALSE` and `keep = FALSE` same as proper constructors.
- unlike `sf_point()` `sf_pt()` does not accept a flat vector for a single point.
- require a matrix or data frame with complete column names.

None of the helpers allow partial name matching for column names.

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Keeping Properties

Setting `keep = TRUE` will retain any columns not specified as a coordinate (x, y, z, m) or an id (e.g., linestring_id, polygon_id) of the input `obj`.

You can use `list_columns` to specify which of the properties will be turned into a list, thus keeping all the values in the column. For columns not specified in `list_columns`, only the first row of the column is kept

The `sf_*` functions assume the input `obj` is a long data.frame / matrix, where any properties are repeated down the table for the same geometry.

Examples

```
x <- cbind(x = 1:2, y = 3:4, linestring_id = 1)
sf_line( x )

x <- data.frame( linestring_id = rep(1:2, each = 2), x = 1:4, y = 4:1 )
(sfx <- sf_line( x ))

## we trivially round-trip with sf_line()
sf_line(sf_to_df(sfx))
```

`sf_linestring` *sf LINESTRING*

Description

constructs sf of LINESTRING objects

Usage

```
sf_linestring(
  obj = NULL,
  x = NULL,
  y = NULL,
  z = NULL,
  m = NULL,
  linestring_id = NULL,
  keep = FALSE,
  list_columns = NULL
)
```

Arguments

`obj`	sorted matrix or data.frame
`x`	x geometry column
`y`	y geometry column
`z`	z geometry column
`m`	m geometry column
`linestring_id`	column of ids for linestrings
`keep`	logical indicating if the non-geometry and non-id columns should be kept. if TRUE you must supply the geometry and id columns, and only the first row of each geometry is kept. See Keeping Properties.
`list_columns`	vector of column names to turn into a list.

Value

`sf` object of LINESTRING geometries

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Keeping Properties

Setting `keep = TRUE` will retain any columns not specified as a coordinate (x, y, z, m) or an id (e.g., linestring_id, polygon_id) of the input `obj`.

You can use `list_columns` to specify which of the properties will be turned into a list, thus keeping all the values in the column. For columns not specified in `list_columns`, only the first row of the column is kept

The `sf_*` functions assume the input `obj` is a long data.frame / matrix, where any properties are repeated down the table for the same geometry.

Examples

```
x <- matrix( c(1:8), ncol = 2 )
sf_linestring( x )

x <- cbind( x, c(1,1,2,2) )
sf_linestring( obj = x, x = 1, y = 2 )
sf_linestring( obj = x, x = 1, y = 2, linestring_id = 3 )

x <- data.frame( line_id = 1:2, x = 1:2, y = 2:1 )
sf_linestring( x )
sf_linestring( x, x = "x", y = "y" )
sf_linestring( x, x = "y", y = "x" )
sf_linestring( x, linestring_id = "line_id", x = "x", y = "y")

## keeping properties
x <- data.frame(
  line_id = c(1,1,2,2)
  , x = 1:4
  , y = 4:1
  , val = letters[1:4]
  , stringsAsFactors = FALSE
  )

## first-row of 'val' is kept
sf_linestring( x, x = "x", y = "y", keep = TRUE )
sf_linestring( x, linestring_id = "line_id", x = "x", y = "y", keep = TRUE )

## 'val' column converted to a list
sf_linestring( x, linestring_id = "id", x = "x", y = "y", keep = TRUE, list_columns = "val" )
```

`sf_mline` *Helper for sf MULTILINESTRING*

Description

Constructs sf of MULTILINESTRING objects, a helper for `sf_multilinestring()` with a simpler syntax.

Usage

```
sf_mline(obj, keep = FALSE, list_columns = NULL)
```

Arguments

`obj`	sorted matrix or data.frame
`keep`	logical indicating if the non-geometry and non-id columns should be kept. if TRUE you must supply the geometry and id columns, and only the first row of each geometry is kept. See Keeping Properties.
`list_columns`	vector of column names to turn into a list.

Value

`sf` object of MULTILINESTRING geometries

Helpers

These are simpler versions of the main functions `sf_point()`, `sf_multipoint()`, `sf_linestring()`, `sf_multilinestring()`, `sf_polygon()`, and `sf_multipolygon()` for input data frame or matrix that contains columns appropriately of 'x', 'y', 'z', 'm', ' multipolygon_id', polygon_id', 'multi-linestring_id', 'linestring_id', 'multipoint_id'.

This puts the onus of the naming and identification of entities onto the input data set, rather than when calling the creator function. This has pros and cons, so is not necessarily always 'simpler'. Please choose the appropriate constructor for the context you have. For examples a data frame from the real world with columns 'lon', 'lat', 'line' will be best used with

```
sf_linestring(df, x = "lon", y = "lat", linestring_id = "line")
```

whereas a heavy user of sfheaders might always create a data frame with 'x', 'y', 'linestring_id' precisely because they are expecting to call `sf_line(df)` and no further work is required. These are very different contexts and both equally valid.

Some columns are mandatory, such as 'x' and 'y' (always), while others depend on the output type where each column for that type is mandatory. The 'z' and/or 'm' values are included for 'XYZ', 'XYM', or 'XYZM' geometry types if and as they are present.

In summary these helpers:

- do not require arguments declaring column names.
- use assumed default column names, with no variation or absence allowed for a given type.

- use z, and/or m if present.
- use close = FALSE and keep = FALSE same as proper constructors.
- unlike sf_point() sf_pt() does not accept a flat vector for a single point.
- require a matrix or data frame with complete column names.

None of the helpers allow partial name matching for column names.

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Keeping Properties

Setting keep = TRUE will retain any columns not specified as a coordinate (x, y, z, m) or an id (e.g., linestring_id, polygon_id) of the input obj.

You can use list_columns to specify which of the properties will be turned into a list, thus keeping all the values in the column. For columns not specified in list_columns, only the first row of the column is kept

The sf_* functions assume the input obj is a long data.frame / matrix, where any properties are repeated down the table for the same geometry.

Examples

```
m <- cbind(x = 0, y = 0, multilinestring_id = c(1, 1, 1), linestring_id = 1)
sf_mline( m )

df <- data.frame(
  multilinestring_id = c(1,1,1,1,1,1,1,1,2,2,2,2,2)
  ,    linestring_id = c(1,1,1,2,2,3,3,3,1,1,1,2,2)
  , x = rnorm(13)
  , y = rnorm(13)
  , z = rnorm(13)
  , m = rnorm(13)
)

sf_mline( obj = df)
sf_mline( obj = df[-6])
## this gives XYZ, not XYM see #64
(sfx <- sf_mline( obj = df[-5]))

## we trivially round-trip with sf_mline()
sf_mline(sf_to_df(sfx))

## to round-trip with all fields use `fill`, then `keep`
sf_mline(sf_to_df(sfx, fill = TRUE), keep = TRUE)
```

sf_mpoly *Helper for sf MULTIPOLYGON*

Description

Constructs sf of MULTIPOLYGON objects, a helper for `sf_multipolygon()` with a simpler syntax.

Usage

```
sf_mpoly(obj, close = TRUE, keep = FALSE, list_columns = NULL)
```

Arguments

obj	sorted matrix or data.frame
close	logical indicating whether polygons should be closed. If TRUE, all polygons will be checked and force closed if possible
keep	logical indicating if the non-geometry and non-id columns should be kept. if TRUE you must supply the geometry and id columns, and only the first row of each geometry is kept. See Keeping Properties.
list_columns	vector of column names to turn into a list.

Value

sf object of MULTIPOLYGON geometries

Helpers

These are simpler versions of the main functions `sf_point()`, `sf_multipoint()`, `sf_linestring()`, `sf_multilinestring()`, `sf_polygon()`, and `sf_multipolygon()` for input data frame or matrix that contains columns appropriately of 'x', 'y', 'z', 'm', ' multipolygon_id', polygon_id', 'multilinestring_id', 'linestring_id', 'multipoint_id'.

This puts the onus of the naming and identification of entities onto the input data set, rather than when calling the creator function. This has pros and cons, so is not necessarily always 'simpler'. Please choose the appropriate constructor for the context you have. For examples a data frame from the real world with columns 'lon', 'lat', 'line' will be best used with

```
sf_linestring(df, x = "lon", y = "lat", linestring_id = "line")
```

whereas a heavy user of sfheaders might always create a data frame with 'x', 'y', 'linestring_id' precisely because they are expecting to call `sf_line(df)` and no further work is required. These are very different contexts and both equally valid.

Some columns are mandatory, such as 'x' and 'y' (always), while others depend on the output type where each column for that type is mandatory. The 'z' and/or 'm' values are included for 'XYZ', 'XYM', or 'XYZM' geometry types if and as they are present.

In summary these helpers:

- do not require arguments declaring column names.
- use assumed default column names, with no variation or absence allowed for a given type.
- use `z`, and/or `m` if present.
- use `close = FALSE` and `keep = FALSE` same as proper constructors.
- unlike `sf_point()` `sf_pt()` does not accept a flat vector for a single point.
- require a matrix or data frame with complete column names.

None of the helpers allow partial name matching for column names.

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Keeping Properties

Setting `keep = TRUE` will retain any columns not specified as a coordinate (x, y, z, m) or an id (e.g., linestring_id, polygon_id) of the input `obj`.

You can use `list_columns` to specify which of the properties will be turned into a list, thus keeping all the values in the column. For columns not specified in `list_columns`, only the first row of the column is kept

The `sf_*` functions assume the input `obj` is a long data.frame / matrix, where any properties are repeated down the table for the same geometry.

Examples

```
m <- matrix(c(0,0,0,0,1,0,0,1,1,0,0,1,0,0,0), ncol = 3, byrow = TRUE,
      dimnames = list(NULL, c("x", "y", "z")))
m <- cbind(m, multipolygon_id = 1, polygon_id = 1, linestring_id = 1)
sf_mpoly( m )

df <- as.data.frame(m)

sf_mpoly( df)

## order doesn't matter, only the names are used
sf_mpoly(df[c(6, 5, 3, 4, 1, 2)])
```

`sf_mpt` *Helper for sf MULTIPOINT*

Description

Constructs sf of MULTIPOINT objects, a helper for `sf_multipoint()` with a simpler syntax.

Usage

```
sf_mpt(obj, keep = FALSE, list_columns = NULL)
```

Arguments

`obj`	sorted vector, matrix or data.frame
`keep`	logical indicating if the non-geometry and non-id columns should be kept. if TRUE you must supply the geometry and id columns, and only the first row of each geometry is kept. See Keeping Properties.
`list_columns`	vector of column names to turn into a list.

Value

`sf` object of MULTIPOINT geometries

Helpers

These are simpler versions of the main functions `sf_point()`, `sf_multipoint()`, `sf_linestring()`, `sf_multilinestring()`, `sf_polygon()`, and `sf_multipolygon()` for input data frame or matrix that contains columns appropriately of 'x', 'y', 'z', 'm', ' multipolygon_id', polygon_id', 'multilinestring_id', 'linestring_id', 'multipoint_id'.

This puts the onus of the naming and identification of entities onto the input data set, rather than when calling the creator function. This has pros and cons, so is not necessarily always 'simpler'. Please choose the appropriate constructor for the context you have. For examples a data frame from the real world with columns 'lon', 'lat', 'line' will be best used with

```
sf_linestring(df, x = "lon", y = "lat", linestring_id = "line")
```

whereas a heavy user of sfheaders might always create a data frame with 'x', 'y', 'linestring_id' precisely because they are expecting to call `sf_line(df)` and no further work is required. These are very different contexts and both equally valid.

Some columns are mandatory, such as 'x' and 'y' (always), while others depend on the output type where each column for that type is mandatory. The 'z' and/or 'm' values are included for 'XYZ', 'XYM', or 'XYZM' geometry types if and as they are present.

In summary these helpers:

- do not require arguments declaring column names.
- use assumed default column names, with no variation or absence allowed for a given type.
- use `z`, and/or `m` if present.

- use `close = FALSE` and `keep = FALSE` same as proper constructors.
- unlike `sf_point()` `sf_pt()` does not accept a flat vector for a single point.
- require a matrix or data frame with complete column names.

None of the helpers allow partial name matching for column names.

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Keeping Properties

Setting `keep = TRUE` will retain any columns not specified as a coordinate (x, y, z, m) or an id (e.g., linestring_id, polygon_id) of the input `obj`.

You can use `list_columns` to specify which of the properties will be turned into a list, thus keeping all the values in the column. For columns not specified in `list_columns`, only the first row of the column is kept

The `sf_*` functions assume the input `obj` is a long data.frame / matrix, where any properties are repeated down the table for the same geometry.

Examples

```
x <- cbind(x = 1:2, y = 3:4, multipoint_id = 1, ncol = 2 )
sf_mpt( x )

x <- data.frame( id = 1:2, x = 1:2, y = 2:1, multipoint_id = 1)
sf_mpt( x )
sf_mpt( x, keep = TRUE)
x <- data.frame(multipoint_id = 1:2, id = 1:2, x = 1:2, y = 2:1 )
(sfx <- sf_mpt(x))

## we trivially round-trip with sf_mpt()
sf_mpt(sf_to_df(sfx))
```

---

sf_multilinestring *sf MULTILINESTRING*

Description

constructs an sf of MULTILINESTRING objects

Usage

```
sf_multilinestring(
  obj = NULL,
  x = NULL,
  y = NULL,
  z = NULL,
  m = NULL,
  multilinestring_id = NULL,
  linestring_id = NULL,
  keep = FALSE,
  list_columns = NULL
)
```

Arguments

obj	sorted matrix or data.frame
x	x geometry column
y	y geometry column
z	z geometry column
m	m geometry column
multilinestring_id	column of ids for multilinestrings
linestring_id	column of ids for linestrings (within multilinestrings)
keep	logical indicating if the non-geometry and non-id columns should be kept. if TRUE you must supply the geometry and id columns, and only the first row of each geometry is kept. See Keeping Properties.
list_columns	vector of column names to turn into a list.

Value

sf object of MULTILINESTRING geometries

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Keeping Properties

Setting keep = TRUE will retain any columns not specified as a coordinate (x, y, z, m) or an id (e.g., linestring_id, polygon_id) of the input obj.

You can use list_columns to specify which of the properties will be turned into a list, thus keeping all the values in the column. For columns not specified in list_columns, only the first row of the column is kept

The sf_* functions assume the input obj is a long data.frame / matrix, where any properties are repeated down the table for the same geometry.

Examples

```
m <- matrix(c(0,0,0,0,1,1), ncol = 3 )
sf_multilinestring( m )

m <- matrix(c(0,0,0,0,0,1,0,1,1,1,2,2,1,2,3), ncol = 3, byrow = TRUE)
sf_multilinestring( obj = m )
sf_multilinestring( obj = m, multilinestring_id = 1 )
sf_multilinestring( obj = m, linestring_id = 1 )

sf_multilinestring( obj = m, linestring_id = 1, multilinestring_id = 1 )

sf_multilinestring( obj = m, x = 2, y = 3 )
sf_multilinestring( obj = m, x = 1, y = 2, z = 3 )
sf_multilinestring( obj = m, x = 2, y = 3, linestring_id = 1, multilinestring_id = 1 )

df <- data.frame(
  ml_id = c(1,1,1,1,1,1,1,2,2,2,2,2)
  , l_id = c(1,1,1,2,2,3,3,3,1,1,1,2,2)
  , x = rnorm(13)
  , y = rnorm(13)
  , z = rnorm(13)
  , m = rnorm(13)
)

sf_multilinestring( obj = df, x = "x", y = "y")
sf_multilinestring( obj = df, x = "x", y = "y", z = "z")
sf_multilinestring( obj = df, x = "x", y = "y", z = "z", m = "m")

sf_multilinestring( obj = df, x = 3, y = 4)
sf_multilinestring( obj = df, x = 3, y = 4, z = 5)
sf_multilinestring( obj = df, x = 3, y = 4, z = 5, m = 6 )

sf_multilinestring( obj = df, multilinestring_id = "ml_id", linestring_id = "l_id" )
sf_multilinestring( obj = df, multilinestring_id = 1, linestring_id = 2 )
```

---

sf_multipoint *sf MULTIPOINT*

Description

constructs sf of MULTIPOINT objects

Usage

```
sf_multipoint(
  obj,
```

```
  x = NULL,
  y = NULL,
  z = NULL,
  m = NULL,
  multipoint_id = NULL,
  keep = FALSE,
  list_columns = NULL
)
```

Arguments

obj	sorted matrix or data.frame
x	x geometry column
y	y geometry column
z	z geometry column
m	m geometry column
multipoint_id	column of ids for multipoints
keep	logical indicating if the non-geometry and non-id columns should be kept. if TRUE you must supply the geometry and id columns, and only the first row of each geometry is kept. See Keeping Properties.
list_columns	vector of column names to turn into a list.

Value

sf object of MULTIPOINT geometries

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Keeping Properties

Setting keep = TRUE will retain any columns not specified as a coordinate (x, y, z, m) or an id (e.g., linestring_id, polygon_id) of the input obj.

You can use list_columns to specify which of the properties will be turned into a list, thus keeping all the values in the column. For columns not specified in list_columns, only the first row of the column is kept

The sf_* functions assume the input obj is a long data.frame / matrix, where any properties are repeated down the table for the same geometry.

Examples

```
x <- matrix( c(1:4), ncol = 2 )
sf_multipoint( x )

x <- data.frame( id = 1:2, x = 1:2, y = 2:1 )
sf_multipoint( x )
sf_multipoint( x, x = "x", y = "y" )
sf_multipoint( x, x = "y", y = "x" )
sf_multipoint( x, multipoint_id = "id", x = "x", y = "y")
```

---

sf_multipolygon *sf MULTIPOLYGON*

Description

constructs an sf of MULTIPOLYGON objects

Usage

```
sf_multipolygon(
  obj = NULL,
  x = NULL,
  y = NULL,
  z = NULL,
  m = NULL,
  multipolygon_id = NULL,
  polygon_id = NULL,
  linestring_id = NULL,
  close = TRUE,
  keep = FALSE,
  list_columns = NULL
)
```

Arguments

obj	sorted matrix or data.frame
x	x geometry column
y	y geometry column
z	z geometry column
m	m geometry column
multipolygon_id	column of ids for multipolygons
polygon_id	column of ids for polygons
linestring_id	column of ids for lines (within polygons)

close	logical indicating whether polygons should be closed. If TRUE, all polygons will be checked and force closed if possible
keep	logical indicating if the non-geometry and non-id columns should be kept. if TRUE you must supply the geometry and id columns, and only the first row of each geometry is kept. See Keeping Properties.
list_columns	vector of column names to turn into a list.

Value

sf object of MULTIPOLYGON geometries

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Keeping Properties

Setting keep = TRUE will retain any columns not specified as a coordinate (x, y, z, m) or an id (e.g., linestring_id, polygon_id) of the input obj.

You can use list_columns to specify which of the properties will be turned into a list, thus keeping all the values in the column. For columns not specified in list_columns, only the first row of the column is kept

The sf_* functions assume the input obj is a long data.frame / matrix, where any properties are repeated down the table for the same geometry.

Examples

```
m <- matrix(c(0,0,0,0,1,0,0,1,1,0,0,1,0,0,0), ncol = 3, byrow = TRUE )
sf_multipolygon( m )

df <- data.frame(
  id = c(1,1,1,1,1)
  , x = c(0,0,1,1,0)
  , y = c(0,1,1,0,0)
)

sf_multipolygon( df, x = "x", y = "y" )

df <- data.frame(
  id = c(1,1,1,1,1,2,2,2,2,2)
  , x = c(0,0,1,1,0,1,1,2,2,1)
  , y = c(0,1,1,0,0,1,2,2,1,1)
)

sf_multipolygon( df, multipolygon_id = "id", polygon_id = "id", linestring_id = "id")

df <- data.frame(
  id1 = c(1,1,1,1,1,1,1,1,1,1)
```

```
  , id2 = c(1,1,1,1,1,2,2,2,2,2)
  , x = c(0,0,1,1,0,1,1,2,2,1)
  , y = c(0,1,1,0,0,1,2,2,1,1)
)

sf_multipolygon( df, multipolygon_id = "id1", polygon_id = "id2")

df <- data.frame(
  id1 = c(1,1,1,1,1,1,1,1,1,1,2,2,2,2,2)
  , id2 = c(1,1,1,1,1,1,2,2,2,2,2,1,1,1,1,1)
  , x = c(0,0,1,1,0,1,1,2,2,1,3,3,4,4,3)
  , y = c(0,1,1,0,0,1,2,2,1,1,3,4,4,3,3)
)

sf_multipolygon( df, multipolygon_id = "id1", polygon_id = "id2")

df <- data.frame(
  id1 = c(1,1,1,1,1,2,2,2,2,2)
  , id2 = c(1,1,1,1,1,1,1,1,1,1)
  , x = c(0,0,1,1,0,1,1,2,2,1)
  , y = c(0,1,1,0,0,1,2,2,1,1)
)

sf_multipolygon( df, multipolygon_id = "id1", polygon_id = "id2" )
sf_multipolygon( df, polygon_id = "id1", linestring_id = "id2" )
sf_multipolygon( df, x = "x", y = "y", polygon_id = "id1")
sf_multipolygon( df, x = "x", y = "y", polygon_id = "id1", linestring_id = "id2")
sf_multipolygon( df, x = "x", y = "y", linestring_id = "id1")
sf_multipolygon( df, x = "x", y = "y", linestring_id = "id2")

df <- data.frame(
  id1 = c('a','a','a','a','a','b','b','b','b','b')
  , id2 = c(1,1,1,1,1,1,1,1,1,1)
  , x = c(0,0,1,1,0,1,1,2,2,1)
  , y = c(0,1,1,0,0,1,2,2,1,1)
)

sf_multipolygon( df, x = "x", y = "y", polygon_id = "id1")
```

`sf_point` *sf POINT*

Description

constructs sf of POINT objects

Usage

```
sf_point(obj, x = NULL, y = NULL, z = NULL, m = NULL, keep = FALSE)
```

Arguments

obj	sorted vector, matrix or data.frame
x	x geometry column
y	y geometry column
z	z geometry column
m	m geometry column
keep	logical indicating if the non-geometry and non-id columns should be kept. if TRUE you must supply the geometry and id columns, and only the first row of each geometry is kept. See Keeping Properties.

Value

sf object of POINT geometries

Keeping Properties

Setting keep = TRUE will retain any columns not specified as a coordinate (x, y, z, m) or an id (e.g., linestring_id, polygon_id) of the input obj.

You can use list_columns to specify which of the properties will be turned into a list, thus keeping all the values in the column. For columns not specified in list_columns, only the first row of the column is kept

The sf_* functions assume the input obj is a long data.frame / matrix, where any properties are repeated down the table for the same geometry.

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Examples

```
x <- c(1:3)
sf_point( x )

x <- matrix( c(1:10) , ncol = 2 )
sf_point( x )

x <- setNames( as.data.frame( x ), c("x","y") )
sf_point( x )
sf_point( obj = x, x = "x", y = "y" )
sf_point( obj = x, x = "y", y = "x" )

# keeping properties
x$val <- letters[1:5]
sf_point( x, x = "x", y = "y", keep = TRUE )
```

sf_poly *Helper for sf POLYGON*

Description

Constructs sf of POLYGON objects, a helper for `sf_polygon()` with a simpler syntax.

Usage

```
sf_poly(obj, close = TRUE, keep = FALSE, list_columns = NULL)
```

Arguments

obj	sorted matrix or data.frame
close	logical indicating whether polygons should be closed. If TRUE, all polygons will be checked and force closed if possible
keep	logical indicating if the non-geometry and non-id columns should be kept. if TRUE you must supply the geometry and id columns, and only the first row of each geometry is kept. See Keeping Properties.
list_columns	vector of column names to turn into a list.

Value

sf object of POLYGON geometries

Helpers

These are simpler versions of the main functions `sf_point()`, `sf_multipoint()`, `sf_linestring()`, `sf_multilinestring()`, `sf_polygon()`, and `sf_multipolygon()` for input data frame or matrix that contains columns appropriately of 'x', 'y', 'z', 'm', ' multipolygon_id', polygon_id', 'multilinestring_id', 'linestring_id', 'multipoint_id'.

This puts the onus of the naming and identification of entities onto the input data set, rather than when calling the creator function. This has pros and cons, so is not necessarily always 'simpler'. Please choose the appropriate constructor for the context you have. For examples a data frame from the real world with columns 'lon', 'lat', 'line' will be best used with

```
sf_linestring(df, x = "lon", y = "lat", linestring_id = "line")
```

whereas a heavy user of sfheaders might always create a data frame with 'x', 'y', 'linestring_id' precisely because they are expecting to call `sf_line(df)` and no further work is required. These are very different contexts and both equally valid.

Some columns are mandatory, such as 'x' and 'y' (always), while others depend on the output type where each column for that type is mandatory. The 'z' and/or 'm' values are included for 'XYZ', 'XYM', or 'XYZM' geometry types if and as they are present.

In summary these helpers:

- do not require arguments declaring column names.

- use assumed default column names, with no variation or absence allowed for a given type.
- use z, and/or m if present.
- use close = FALSE and keep = FALSE same as proper constructors.
- unlike sf_point() sf_pt() does not accept a flat vector for a single point.
- require a matrix or data frame with complete column names.

None of the helpers allow partial name matching for column names.

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Keeping Properties

Setting keep = TRUE will retain any columns not specified as a coordinate (x, y, z, m) or an id (e.g., linestring_id, polygon_id) of the input obj.

You can use list_columns to specify which of the properties will be turned into a list, thus keeping all the values in the column. For columns not specified in list_columns, only the first row of the column is kept

The sf_* functions assume the input obj is a long data.frame / matrix, where any properties are repeated down the table for the same geometry.

Examples

```
m <- matrix(c(0,0,0,0,1,0,0,1,1,0,0,1,0,0,0), ncol = 3, byrow = TRUE,
      dimnames = list(NULL, c("x", "y", "z")))
m <- cbind(m, polygon_id = 1, linestring_id = 1)
sf_poly( m )

df <- as.data.frame(m)

sf_poly( df)

## order doesn't matter, only the names are used
sf_poly(df[c(5, 3, 4, 1, 2)])
```

---

sf_polygon *sf POLYGON*

Description

constructs an sf of POLYGON objects

Usage

```
sf_polygon(
  obj = NULL,
  x = NULL,
  y = NULL,
  z = NULL,
  m = NULL,
  polygon_id = NULL,
  linestring_id = NULL,
  close = TRUE,
  keep = FALSE,
  list_columns = NULL
)
```

Arguments

obj	sorted matrix or data.frame
x	x geometry column
y	y geometry column
z	z geometry column
m	m geometry column
polygon_id	column of ids for polygons
linestring_id	column of ids for lines (within polygons)
close	logical indicating whether polygons should be closed. If TRUE, all polygons will be checked and force closed if possible
keep	logical indicating if the non-geometry and non-id columns should be kept. if TRUE you must supply the geometry and id columns, and only the first row of each geometry is kept. See Keeping Properties.
list_columns	vector of column names to turn into a list.

Value

sf object of POLYGON geometries

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Keeping Properties

Setting keep = TRUE will retain any columns not specified as a coordinate (x, y, z, m) or an id (e.g., linestring_id, polygon_id) of the input obj.

You can use `list_columns` to specify which of the properties will be turned into a list, thus keeping all the values in the column. For columns not specified in `list_columns`, only the first row of the column is kept

The `sf_*` functions assume the input `obj` is a long data.frame / matrix, where any properties are repeated down the table for the same geometry.

Examples

```
m <- matrix(c(0,0,0,0,1,1), ncol = 2 )
sf_polygon( m )

m <- matrix(c(0,0,0,0,0,1,0,1,1,1,2,2,1,2,3,1,3,4), ncol = 3, byrow = TRUE)
sf_polygon( obj = m )
sf_polygon( obj = m, polygon_id = 1 )
sf_polygon( obj = m, linestring_id = 1 )

sf_polygon( obj = m, linestring_id = 1, polygon_id = 1 )

sf_polygon( obj = m, x = 2, y = 3 )
sf_polygon( obj = m, x = 1, y = 2, z = 3 )
sf_polygon( obj = m, x = 2, y = 3, linestring_id = 1, polygon_id = 1 )

df <- data.frame(
  ml_id = c(1,1,1,1,1,1,1,1,1,2,2,2,2,2,2)
  , l_id = c(1,1,1,2,2,2,3,3,3,1,1,1,2,2,2)
  , x = rnorm(15)
  , y = rnorm(15)
  , z = rnorm(15)
  , m = rnorm(15)
)

sf_polygon( obj = df, x = "x", y = "y")
sf_polygon( obj = df, x = "x", y = "y", z = "z")
sf_polygon( obj = df, x = "x", y = "y", z = "z", m = "m")

sf_polygon( obj = df, x = 2, y = 3)
sf_polygon( obj = df, x = 2, y = 3, z = 4)
sf_polygon( obj = df, x = 2, y = 3, z = 4, m = 5)

sf_polygon( obj = df, polygon_id = "ml_id", linestring_id = "l_id" )
sf_polygon( obj = df, polygon_id = 1, linestring_id = 2 )

## keeping properties
df <- data.frame(
  ml_id = c(1,1,1,1,1,1,1,1,1,2,2,2,2,2,2)
  , l_id = c(1,1,1,2,2,2,3,3,3,1,1,1,2,2,2)
  , x = rnorm(15)
  , y = rnorm(15)
  , z = rnorm(15)
  , m = rnorm(15)
  , val = letters[1:15]
  , stringsAsFactors = FALSE
```

```
)

## using keep = TRUE means the first row of all non-geometries are kept
sf_polygon(
  obj = df
  , polygon_id = "ml_id"
  , linestring_id = "l_id"
  , x = "x"
  , y = "y"
  , keep = TRUE
)

## use 'list_column' to specify columns where you want to keep all the values
sf_polygon(
  obj = df
  , polygon_id = "ml_id"
  , linestring_id = "l_id"
  , x = "x"
  , y = "y"
  , keep = TRUE
  , list_columns = "val"
)
```

`sf_pt` *Helper for sf POINT*

Description

Constructs sf of POINT objects, a helper for `sf_point()` with a simpler syntax.

Usage

```
sf_pt(obj, keep = FALSE)
```

Arguments

`obj`	sorted vector, matrix or data.frame
`keep`	logical indicating if the non-geometry and non-id columns should be kept. if TRUE you must supply the geometry and id columns, and only the first row of each geometry is kept. See Keeping Properties.

Value

`sf` object of POINT geometries

Helpers

These are simpler versions of the main functions `sf_point()`, `sf_multipoint()`, `sf_linestring()`, `sf_multilinestring()`, `sf_polygon()`, and `sf_multipolygon()` for input data frame or matrix that contains columns appropriately of 'x', 'y', 'z', 'm', ' multipolygon_id', polygon_id', 'multi-linestring_id', 'linestring_id', 'multipoint_id'.

This puts the onus of the naming and identification of entities onto the input data set, rather than when calling the creator function. This has pros and cons, so is not necessarily always 'simpler'. Please choose the appropriate constructor for the context you have. For examples a data frame from the real world with columns 'lon', 'lat', 'line' will be best used with

```
sf_linestring(df, x = "lon", y = "lat", linestring_id = "line")
```

whereas a heavy user of sfheaders might always create a data frame with 'x', 'y', 'linestring_id' precisely because they are expecting to call `sf_line(df)` and no further work is required. These are very different contexts and both equally valid.

Some columns are mandatory, such as 'x' and 'y' (always), while others depend on the output type where each column for that type is mandatory. The 'z' and/or 'm' values are included for 'XYZ', 'XYM', or 'XYZM' geometry types if and as they are present.

In summary these helpers:

- do not require arguments declaring column names.
- use assumed default column names, with no variation or absence allowed for a given type.
- use `z`, and/or `m` if present.
- use `close = FALSE` and `keep = FALSE` same as proper constructors.
- unlike `sf_point()` `sf_pt()` does not accept a flat vector for a single point.
- require a matrix or data frame with complete column names.

None of the helpers allow partial name matching for column names.

notes

sfheaders functions do not perform any validity checks on the geometries. Nor do they set Coordinate Reference Systems, EPSG, PROJ4 or precision attributes.

The data.frame and matrices you send into the sfheader functions must be ordered.

Keeping Properties

Setting `keep = TRUE` will retain any columns not specified as a coordinate (x, y, z, m) or an id (e.g., linestring_id, polygon_id) of the input `obj`.

You can use `list_columns` to specify which of the properties will be turned into a list, thus keeping all the values in the column. For columns not specified in `list_columns`, only the first row of the column is kept

The `sf_*` functions assume the input `obj` is a long data.frame / matrix, where any properties are repeated down the table for the same geometry.

Examples

```
x <- cbind(x = 1, y= 3)
sf_pt( x )
sf_pt(cbind(x, z = 2))

x <- matrix( c(1:10) , ncol = 2 , dimnames = list(NULL, c("x", "y")))
sf_pt( x )

x <- setNames( as.data.frame( x ), c("x","y") )
sf_pt( x )

# keeping properties
x$val <- letters[1:5]
(sfx <- sf_pt( x, keep = TRUE ))

## we trivially round-trip with sf_pt()
sf_pt(sf_to_df(sfx, fill = TRUE), keep = TRUE)
```

---

sf_remove_holes *remove holes*

Description

Removes holes from polygons and multipolygons. Points and linestrings are unaffected.

Usage

```
sf_remove_holes(obj, close = TRUE)
```

Arguments

obj	sfg, sfc or sf object.
close	logical indicating whether polygons should be closed. If TRUE, all polygons will be checked and force closed if possible

Examples

```
df <- data.frame(
  ml_id = c(1,1,1,1,1,1,1,1,2,2,2,2,2)
  , l_id = c(1,1,1,2,2,2,3,3,3,1,1,1,2,2,2)
  , x = rnorm(15)
  , y = rnorm(15)
  , z = rnorm(15)
  , m = rnorm(15)
)

sfg <- sfg_polygon( obj = df, x = "x", y = "y", linestring_id = "ml_id" )
sfc <- sfc_polygon( obj = df, x = "x", y = "y", polygon_id = "ml_id", linestring_id = "l_id" )
sf <- sf_polygon( obj = df, x = "x", y = "y", polygon_id = "ml_id", linestring_id = "l_id" )
```

```
sf_remove_holes( sfg )
sf_remove_holes( sfc )
sf_remove_holes( sf )
```

`sf_to_df` *sf to df*

Description

Converts an sf object to a data.frame

Usage

```
sf_to_df(sf, fill = FALSE, unlist = NULL)
```

Arguments

`sf`	sf object
`fill`	logical indicating if the resulting data.frame should be filled with the data columns from the sf object. If `TRUE`, each row of data will be replicated for every coordinate in every geometry.
`unlist`	string vector of columns to unlist. Each list element is equivalent to a row of the input object, and is expected to be the same length as the number of coordinates in the geometry.

Examples

```
df <- data.frame(
ml_id = c(1,1,1,1,1,1,1,1,1,2,2,2,2,2,2)
, l_id = c(1,1,1,2,2,2,3,3,3,1,1,1,2,2,2)
, x = rnorm(15)
, y = rnorm(15)
, z = rnorm(15)
, m = rnorm(15)
)

sf <- sf_polygon( obj = df, polygon_id = "ml_id", linestring_id = "l_id" )
df <- sf_to_df( sf )

## with associated data
sf$val1 <- c("a","b")
sf$val2 <- c(1L, 2L)

df <- sf_to_df( sf, fill = TRUE )

## Unlisting list columns
```

```
df <- data.frame(
l_id = c(1,1,1,2,2,2,3,3,3,3)
, x = rnorm(10)
, y = rnorm(10)
)

sf <- sf_linestring( obj = df, linestring_id = "l_id" , x = "x", y = "y")

## put on a list column
sf$l <- list( c(1,2,3),c(3,2,1),c(10,11,12,13))

sf_to_df( sf, unlist = "l" )
```

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