Package 'wkutils'

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Title Utilities for Well-Known Geometry Vectors

Version 0.1.3

Description Provides extra utilities for well-known formats in the 'wk' package that are outside the scope of that package. Utilities to parse coordinates from data frames, plot well-known geometry vectors, extract meta information from well-known geometry vectors, and calculate bounding boxes are provided.

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Encoding UTF-8

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Imports wk (>= 0.3.1), Rcpp, tibble, vctrs

LinkingTo Rcpp

Suggests testthat

URL https://paleolimbot.github.io/wkutils/, https://github.com/paleolimbot/wkutils

BugReports https://github.com/paleolimbot/wkutils/issues

NeedsCompilation yes

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Contents

`coords_point_translate_wkt` *Parse coordinates into well-known formats*

Description

These functions provide the reverse function of `wkt_coords()` and company: they parse vectors of coordinate values into well-known formats. Polygon rings are automatically closed, as closed rings are assumed or required by many parsers.

Usage

```
coords_point_translate_wkt(x, y, z = NA, m = NA, precision = 16, trim = TRUE)

coords_point_translate_wkb(
  x,
  y,
  z = NA,
  m = NA,
  endian = wk::wk_platform_endian(),
  buffer_size = 2048
)

coords_linestring_translate_wkt(
  x,
  y,
  z = NA,
  m = NA,
  feature_id = 1L,
  precision = 16,
  trim = TRUE
)

coords_linestring_translate_wkb(
  x,
  y,
  z = NA,
  m = NA,
  feature_id = 1L,
```

```
  endian = wk::wk_platform_endian(),
  buffer_size = 2048
)

coords_polygon_translate_wkt(
  x,
  y,
  z = NA,
  m = NA,
  feature_id = 1L,
  ring_id = 1L,
  precision = 16,
  trim = TRUE
)

coords_polygon_translate_wkb(
  x,
  y,
  z = NA,
  m = NA,
  feature_id = 1L,
  ring_id = 1L,
  endian = wk::wk_platform_endian(),
  buffer_size = 2048
)
```

Arguments

x, y, z, m	Vectors of coordinate values
precision	The rounding precision to use when writing (number of decimal places).
trim	Trim unnecessary zeroes in the output?
endian	Force the endian of the resulting WKB.
buffer_size	The buffer size to use when converting to WKB.
feature_id, ring_id	Vectors for which a change in sequential values indicates a new feature or ring. Use `factor()` to convert from a character vector.

Value

`*_translate_wkt()` returns a character vector of well-known text; `*_translate_wkb()` returns a list of raw vectors.

Examples

```
coords_point_translate_wkt(1:3, 2:4)
coords_linestring_translate_wkt(1:5, 2:6, feature_id = c(1, 1, 1, 2, 2))
coords_polygon_translate_wkt(c(0, 10, 0), c(0, 0, 10))
```

wkb_coords *Extract coordinates from well-known geometries*

Description

These functions are optimised for graphics output, which in R require flat coordinate structures. See `graphics::points()`, `graphics::lines()`, and `graphics::polypath()` for how to send these to a graphics device, or `grid::pointsGrob()`, `grid::linesGrob()`, and `grid::pathGrob()` for how to create graphical objects using this output.

Usage

```
wkb_coords(wkb, sep_na = FALSE)

wkt_coords(wkt, sep_na = FALSE)
```

Arguments

wkb	A `list()` of `raw()` vectors, such as that returned by `sf::st_as_binary()`.
sep_na	Use `TRUE` to separate geometries and linear rings with a row of `NA`s. This is useful for generating output that can be fed directly to `graphics::polypath()` or `graphics::lines()` without modification.
wkt	A character vector containing well-known text.

Value

A data.frame with columns:

- `feature_id`: The index of the top-level feature
- `part_id`: The part identifier, guaranteed to be unique for every simple geometry (including those contained within a multi-geometry or collection)
- `ring_id`: The ring identifier, guaranteed to be unique for every ring.
- `x`, `y`, `z`, `m`: Coordinaate values (both absence and `nan` are recorded as `NA`)

Examples

```
text <- c("LINESTRING (0 1, 19 27)", "LINESTRING (-1 -1, 4 10)")
wkt_coords(text)
wkt_coords(text, sep_na = TRUE)
```

wkb_debug *Debug well-known geometry*

Description

Prints the raw calls to the `WKBGeometryHandler()`. Useful for writing custom C++ handlers and debugging read problems.

Usage

```
wkb_debug(wkb)

wkt_debug(wkt)

wkt_streamer_debug(wkt)
```

Arguments

`wkb`	A `list()` of `raw()` vectors, such as that returned by `sf::st_as_binary()`.
`wkt`	A character vector containing well-known text.

Value

The input, invisibly

Examples

```
wkt_debug("MULTIPOLYGON (((0 0, 10 0, 0 10, 0 0)))")
wkt_streamer_debug("MULTIPOLYGON (((0 0, 10 0, 0 10, 0 0)))")
wkb_debug(
  wk::wkt_translate_wkb(
    "MULTIPOLYGON (((0 0, 10 0, 0 10, 0 0)))"
  )
)
```

wkb_draw_points *Draw well-known geometries*

Description

These functions send well-known geometry vectors to a graphics device using `graphics::points()`, `graphics::lines()`, and `graphics::polypath()`. These are minimal wrappers aimed at developers who need to visualize test data: they do not check geometry type and are unlikely to work with vectorized graphical parameters in `...`. Use the `wk*_plot_new()` functions to initialize a plot using the extent of all coordinates in the vector.

Usage

```
wkb_draw_points(wkb, ...)

wkt_draw_points(wkt, ...)

wkb_draw_lines(wkb, ...)

wkt_draw_lines(wkt, ...)

wkb_draw_polypath(wkb, ..., rule = "evenodd")

wkt_draw_polypath(wkt, ..., rule = "evenodd")

wkb_plot_new(
  wkb,
  ...,
  asp = 1,
  xlab = "",
  ylab = "",
  main = deparse(substitute(wkb))
)

wkt_plot_new(
  wkt,
  ...,
  asp = 1,
  xlab = "",
  ylab = "",
  main = deparse(substitute(wkt))
)
```

Arguments

wkb	A `list()` of `raw()` vectors, such as that returned by `sf::st_as_binary()`.
...	Passed to `graphics::points()`, `graphics::lines()`, or `graphics::polypath()`
wkt	A character vector containing well-known text.
rule	Passed to `graphics::polypath()`
asp, xlab, ylab, main	Passed to `graphics::plot()` to initialize a new plot.

Value

The input, invisibly

Examples

```
x <- "POLYGON ((0 0, 10 0, 10 10, 0 10, 0 0))"
```

```
wkt_plot_new(x)
wkt_draw_polypath(x, col = "grey90")
wkt_draw_lines(x, col = "red")
wkt_draw_points(x)
```

---

wkb_meta *Extract meta information*

Description

Extract meta information

Usage

```
wkb_meta(wkb, recursive = FALSE)

wkt_meta(wkt, recursive = FALSE)

wkt_streamer_meta(wkt, recursive = FALSE)

wk_geometry_type(type_id)

wk_geometry_type_id(type)
```

Arguments

wkb	A list() of raw() vectors, such as that returned by sf::st_as_binary().
recursive	Pass TRUE to recurse into multi-geometries and collections to extract meta of sub-geometries
wkt	A character vector containing well-known text.
type_id	An integer version of the geometry type
type	A string version of the geometry type (e.g., point, linestring, polygon, multipoint, multilinestring, multipolygon, geometrycollection)

Value

A data.frame with columns:

- feature_id: The index of the top-level feature
- nest_id: The recursion level (if feature is a geometry collection)
- part_id: The part index (if nested within a multi-geometry or collection)
- type_id: The type identifier (see wk_geometry_type())
- size: For points and linestrings the number of points, for polygons the number of rings, and for mutlti-geometries and collection types, the number of child geometries.
- srid: The spatial reference identifier as an integer

Examples

```
wkt_meta("POINT (30 10)")
wkt_meta("GEOMETRYCOLLECTION (POINT (30 10))", recursive = FALSE)
wkt_meta("GEOMETRYCOLLECTION (POINT (30 10))", recursive = TRUE)
```

---

wkb_ranges *Extract ranges information*

Description

This is intended to behave the same as `range()`, returning the minimum and maximum x, y, z, and m coordinate values.

Usage

```
wkb_ranges(wkb, na.rm = FALSE, finite = FALSE)

wkt_ranges(wkt, na.rm = FALSE, finite = FALSE)

wkb_feature_ranges(wkb, na.rm = FALSE, finite = FALSE)

wkt_feature_ranges(wkt, na.rm = FALSE, finite = FALSE)
```

Arguments

wkb	A `list()` of `raw()` vectors, such as that returned by `sf::st_as_binary()`.
na.rm	Pass `TRUE` to not consider missing (nan) values
finite	Pass `TRUE` to only consider finite (non-missing, non-infinite) values.
wkt	A character vector containing well-known text.

Value

A data.frame with columns:

- `xmin`, `ymin`, `zmin`, and `mmin`: Minimum coordinate values
- `xmax`, `ymax`, `zmax`, and `mmax`: Maximum coordinate values

Examples

```
wkt_ranges("POINT (30 10)")
```

wkt_grob *Generate grid geometries from well-known geometries*

Description

Using `wkt_meta()` and `wkt_coords()`, these functions create graphical objects using the grid package. Vectors that contain geometries of a single dimension are efficiently packed into a `grid::pointsGrob()`, `grid::polylineGrob()`, or `grid::pathGrob()`. Vectors with mixed types and nested collections are encoded less efficiently using a `grid::gTree()`.

Usage

```
wkt_grob(
  wkt,
  ...,
  rule = "evenodd",
  default.units = "native",
  name = NULL,
  vp = NULL
)

wkb_grob(
  wkt,
  ...,
  rule = "evenodd",
  default.units = "native",
  name = NULL,
  vp = NULL
)
```

Arguments

wkt	A character vector containing well-known text.
...	Graphical parameters passed to `grid::gpar()`. These are recycled along the input. Dynamic dots (e.g., `!!!`) are supported.
rule	Use "winding" if polygon rings are correctly encoded with a winding direction.
default.units	Coordinate units, which may be defined by the viewport (see `grid::unit()`). Defaults to native.
name, vp	Passed to `grid::pointsGrob()`, `grid::polylineGrob()`, `grid::pathGrob()`, or `grid::gTree()` depending on the types of geometries in the input.

Value

A graphical object

Examples

```
grid::grid.newpage()
grid::grid.draw(wkt_grob("POINT (0.5 0.5)", pch = 16, default.units = "npc"))
```

`wkt_has_missing` *Test well-known geometries for missing and non-finite coordinates*

Description

Note that EMTPY geometries are considered finite and non-missing. Use the `size` column of `wkt_meta()` to test for empty geometries.

Usage

```
wkt_has_missing(wkt)

wkb_has_missing(wkb)

wkt_is_finite(wkt)

wkb_is_finite(wkb)
```

Arguments

`wkt`	A character vector containing well-known text.
`wkb`	A `list()` of `raw()` vectors, such as that returned by `sf::st_as_binary()`.

Value

A logical vector with the same length as the input.

Examples

```
wkt_has_missing("POINT (0 1)")
wkt_has_missing("POINT (nan nan)")
wkt_has_missing("POINT (inf inf)")

wkt_is_finite("POINT (0 1)")
wkt_is_finite("POINT (nan nan)")
wkt_is_finite("POINT (inf inf)")
```

wkt_plot *Plot well-known geometry vectors*

Description

These plot functions are intended to help debug geometry vectors, and are not intended to be high-performance.

Usage

```
wkt_plot(
  x,
  ...,
  asp = 1,
  bbox = NULL,
  xlab = "",
  ylab = "",
  rule = "evenodd",
  add = FALSE
)

wkb_plot(
  x,
  ...,
  asp = 1,
  bbox = NULL,
  xlab = "",
  ylab = "",
  rule = "evenodd",
  add = FALSE
)
```

Arguments

x	A wkt() or wkb() vector.
...	Passed to plotting functions for features: graphics::points() for point and multipoint geometries, graphics::lines() for linestring and multilinestring geometries, and graphics::polypath() for polygon and multipolygon geometries.
asp, xlab, ylab	Passed to graphics::plot()
bbox	The limits of the plot in the form returned by wkt_ranges().
rule	The rule to use for filling polygons (see graphics::polypath())
add	Should a new plot be created, or should x be added to the existing plot?

Value

x, invisibly

Examples

```
wkt_plot("POINT (30 10)")
```

`wkt_set_srid` *Modify well-known geometries*

Description

Modify well-known geometries

Usage

```
wkt_set_srid(wkt, srid, precision = 16, trim = TRUE)

wkb_set_srid(wkb, srid)

wkt_set_z(wkt, z, precision = 16, trim = TRUE)

wkb_set_z(wkb, z)

wkt_transform(wkt, trans, precision = 16, trim = TRUE)

wkb_transform(wkb, trans)
```

Arguments

`wkt`	A character vector containing well-known text.
`srid`	An integer spatial reference identifier with a user-defined meaning. Use `NA` to unset this value.
`precision`	The rounding precision to use when writing (number of decimal places).
`trim`	Trim unnecessary zeroes in the output?
`wkb`	A `list()` of `raw()` vectors, such as that returned by `sf::st_as_binary()`.
`z`	A Z value that will be assigned to every coordinate in each feature. Use `NA` to unset this value.
`trans`	A 3x3 transformation matrix that will be applied to all coordinates in the input.

Value

An unclassed well-known vector with the same type as the input.

Examples

```
wkt_set_srid("POINT (30 10)", 1234)
wkt_set_z("POINT (30 10)", 1234)
wkt_transform(
  "POINT (0 0)",
  # translation +12 +13
  matrix(c(1, 0, 0, 0, 1, 0, 12, 13, 1), ncol = 3)
)
```

---

wkt_unnest *Flatten nested geometry structures*

Description

Flatten nested geometry structures

Usage

```
wkt_unnest(wkt, keep_empty = FALSE, keep_multi = TRUE, max_depth = 1)

wkb_unnest(wkb, keep_empty = FALSE, keep_multi = TRUE, max_depth = 1)
```

Arguments

wkt	A character vector containing well-known text.
keep_empty	If TRUE, a GEOMETRYCOLLECTION EMPTY is left as-is rather than collapsing to length 0.
keep_multi	If TRUE, MULTI* geometries are not expanded to sub-features.
max_depth	The maximum recursive GEOMETRYCOLLECTION depth to unnest.
wkb	A list() of raw() vectors, such as that returned by sf::st_as_binary().

Value

An unclassed vector with attribute lengths, which is an integer vector with the same length as the input denoting the length to which each feature was expanded.

Examples

```
wkt_unnest("GEOMETRYCOLLECTION (POINT (1 2), POINT (3 4))")
wkt_unnest("GEOMETRYCOLLECTION EMPTY")
wkt_unnest("GEOMETRYCOLLECTION EMPTY", keep_empty = TRUE)
```

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