Package ‘wkutils’

January 11, 2021

Title Utilities for Well-Known Geometry Vectors

Version 0.1.1

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

LazyData true

RoxygenNote 7.1.1

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

LinkingTo wk, Rcpp

Suggests testthat


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

NeedsCompilation yes

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Repository CRAN

Date/Publication 2021-01-11 15:10:02 UTC

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coords_point_translate_wkt

Parse coordinates into well-known formats

Description

These functions provide the reverse function of \texttt{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

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

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

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

```r
coords_linestring_translate_wkb(
  x,
  y,
  z = NA,
  m = NA,
```
coords_point_translate_wkt

    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          For WKB writing, 0 for big endian, 1 for little endian. Defaults to wk_platform_endian()
                 (slightly faster).
buffer_size     For WKB writing, the initial buffer size to use for each feature, in bytes. This
                 will be extended when needed, but if you are calling this repeatedly with huge
                 geometries, setting this value to a larger number may result in less copying.
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)
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 NAs. 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: Coordinate 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**

```r
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**

```r
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))"
wkb_meta

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 multi-geometries and collection types, the number of child geometries.
- srid: The spatial reference identifier as an integer
Examples

```r
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**

```r
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**

```r
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

```r
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

```r
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

```r
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

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

```r
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 \texttt{wkt()} or \texttt{wkb()} vector.
...
Passed to \texttt{graphics::plot()}

asp, xlab, ylab Passed to \texttt{graphics::plot()}

bbox The limits of the plot in the form returned by \texttt{wkt_ranges()}

rule The rule to use for filling polygons (see \texttt{graphics::polypath()})

add Should a new plot be created, or should \texttt{x} be added to the existing plot?

Value

\texttt{x}, invisibly
**wkt_set_srid**

**Examples**

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

**Description**

Modify well-known geometries

**Usage**

```r
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.
**wkt_unnest**

### Examples

```r
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)
)
```

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

---

**Flatten nested geometry structures**

**Description**

Flatten nested geometry structures

**Usage**

```r
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**

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