

Package: rgeodesy (via r-universe)

October 16, 2026

Title R Interface to Rust Geodesy

Version 0.1.0

Description Provides R bindings to the Rust Geodesy library by Thomas Knudsen, a platform for experiments with geodetic transformations and data flow. Exposes the pipeline operator model — compose transformations from named primitives such as 'utm', 'helmert', 'molodensky', and 'geo:in' adaptors — and apply them to vectors of coordinates. Useful for learning the Rust Geodesy architecture and for geodetic operations not available in 'PROJ'-based tools.

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SystemRequirements Cargo (Rust's package manager), rustc (>= 1.87)

URL <https://github.com/hypertidy/rgeodesy>,
<https://hypertidy.github.io/rgeodesy/>

BugReports <https://github.com/hypertidy/rgeodesy/issues>

Suggests testthat (>= 3.0.0), knitr, rmarkdown

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geod_apply	<i>Apply a Rust Geodesy pipeline to coordinate vectors</i>
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Description

Compiles the pipeline once and applies it, vectorised, to all coordinate pairs. Coordinates follow Rust Geodesy conventions: geographic data must be bracketed with an adaptor operator (gis:in/gis:out for (lon, lat) in degrees, or geo:in/geo:out for (lat, lon)), because RG works internally in radians.

Usage

```
geod_apply(op_str, x, y, inv = FALSE)
```

Arguments

op_str	Character scalar. A Rust Geodesy pipeline string, e.g. "gis:in utm zone=32".
x	Numeric vector. First coordinate (longitude/easting under the GIS convention).
y	Numeric vector. Second coordinate (latitude/northing). Must be the same length as x.
inv	Logical scalar. Run the inverse operation. Default FALSE.

Value

A named list with numeric elements x and y, each the same length as the input.

See Also

[geod_xy\(\)](#) for matrix output, [geod_validate\(\)](#), [geod_ops\(\)](#)

Other geodesy functions: [geod_ops\(\)](#), [geod_validate\(\)](#), [geod_xy\(\)](#)

Examples

```
# Geographic (lon, lat) in degrees -> UTM zone 55 south (easting, northing)
geod_apply("gis:in | utm zone=55 south", x = c(147.3, 147.5), y = c(-42.9, -42.8))

# Round trip: forward then inverse recovers the input
fwd <- geod_apply("gis:in | utm zone=55 south", x = 147.3, y = -42.9)
geod_apply("gis:in | utm zone=55 south", x = fwd$x, y = fwd$y, inv = TRUE)
```

```
# Multi-step pipeline: geographic in, northing-easting-up out
geod_apply("gis:in | utm zone=32 | neu:out", x = c(12, 18), y = c(55, 59))
```

`geod_ops`*List available Rust Geodesy operators*

Description

Returns the names of the built-in operators and coordinate adaptors registered in a Minimal Rust Geodesy context. The list reflects the crate version pinned by the package (Rust Geodesy 0.15).

Usage

```
geod_ops()
```

Value

A sorted character vector of operator names.

See Also

Other rgeodesy functions: [geod_apply\(\)](#), [geod_validate\(\)](#), [geod_xy\(\)](#)

Examples

```
ops <- geod_ops()
length(ops)
c("utm", "helmert", "laea") %in% ops
```

`geod_validate`*Validate a Rust Geodesy pipeline string*

Description

Attempts to compile the pipeline and returns TRUE if it succeeds, or a character string describing the error if it fails. Useful for checking a pipeline interactively before passing it to [geod_apply\(\)](#).

Usage

```
geod_validate(op_str)
```

Arguments

`op_str` Character scalar. A pipeline string to validate.

Value

TRUE if valid, otherwise a character string with the error message.

See Also

Other rgeodesy functions: [geod_apply\(\)](#), [geod_ops\(\)](#), [geod_xy\(\)](#)

Examples

```
geod_validate("gis:in | utm zone=55 south") # TRUE
geod_validate("utm zone=banana")           # error string
```

geod_xy

Apply a pipeline and return a two-column matrix

Description

Convenience wrapper around [geod_apply\(\)](#) that returns a numeric matrix with columns x and y rather than a list.

Usage

```
geod_xy(op_str, x, y, inv = FALSE)
```

Arguments

op_str	Character scalar. A Rust Geodesy pipeline string, e.g. "gis:in utm zone=32".
x	Numeric vector. First coordinate (longitude/easting under the GIS convention).
y	Numeric vector. Second coordinate (latitude/northing). Must be the same length as x.
inv	Logical scalar. Run the inverse operation. Default FALSE.

Value

A numeric matrix with columns x and y, one row per input point.

See Also

Other rgeodesy functions: [geod_apply\(\)](#), [geod_ops\(\)](#), [geod_validate\(\)](#)

Examples

```
geod_xy("gis:in | utm zone=55 south", x = c(147.3, 147.5), y = c(-42.9, -42.8))
```

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