

Package ‘rpostgis’

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Title R Interface to a 'PostGIS' Database

Description Provides an interface between R and 'PostGIS'-enabled 'PostgreSQL' databases to transparently transfer spatial data. Both vector (points, lines, polygons) and raster data are supported in read and write modes. Also provides convenience functions to execute common procedures in 'PostgreSQL/PostGIS'.

SystemRequirements 'PostgreSQL' with 'PostGIS' extension

Depends R (>= 3.3.0),
RPostgreSQL,
DBI (>= 0.5)

Imports methods,
raster,
rgeos,
sp,
stats

Suggests rgdal,
wkb

License GPL (>= 3)

LazyData true

URL <https://github.com/mabl原因/rpostgis>

BugReports <https://github.com/mabl原因/rpostgis/issues>

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R topics documented:

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|----------|-----------------|
| dbAddKey | <i>Add key.</i> |
|----------|-----------------|

Description

Add a primary or foreign key to a table column.

Usage

```
dbAddKey(conn, name, colname, type = c("primary", "foreign"), reference,
         colref, display = TRUE, exec = TRUE)
```

Arguments

| | |
|-----------|-----------------------------------------------------------------------------------------------------------------------------|
| conn | A connection object. |
| name | A character string specifying a PostgreSQL table name. |
| colname | A character string specifying the name of the column to which the key will be assign. |
| type | The type of the key, either "primary" or "foreign" |
| reference | A character string specifying a foreign table name to which the foreign key will be associated. |
| colref | A character string specifying the name of the primary key in the foreign table to which the foreign key will be associated. |
| display | Logical. Whether to display the query (defaults to TRUE). |
| exec | Logical. Whether to execute the query (defaults to TRUE). |

Value

TRUE if the key was successfully added.

Author(s)

Mathieu Basille <basille@uf1.edu>

See Also

The PostgreSQL documentation: <http://www.postgresql.org/docs/current/static/sql-altertable.html>

Examples

```
## examples use a dummy connection from DBI package
conn<-DBI::ANSI()
dbAddKey(conn, name = c("schema", "table"), colname = "id", type = "foreign",
         reference = c("flu", "bla"), colref = "id", exec = FALSE)
```

| | |
|----------|-------------------------------|
| dbAsDate | <i>Converts to timestamp.</i> |
|----------|-------------------------------|

Description

Convert a date field to a timestamp with or without time zone.

Usage

```
dbAsDate(conn, name, date = "date", tz = NULL, display = TRUE,
         exec = TRUE)
```

Arguments

| | |
|---------|---------------------------------------------------------------------------------------------|
| conn | A connection object. |
| name | A character string specifying a PostgreSQL table name. |
| date | A character string specifying the date field. |
| tz | A character string specifying the time zone, in "EST", "America/New_York", "EST5EDT", "-5". |
| display | Logical. Whether to display the query (defaults to TRUE). |
| exec | Logical. Whether to execute the query (defaults to TRUE). |

Value

If `exec = TRUE`, returns TRUE if the conversion was successful.

Author(s)

Mathieu Basille <basille@ufl.edu>

See Also

The PostgreSQL documentation: <http://www.postgresql.org/docs/current/static/datatype-datetime.html>

Examples

```
## Example uses a dummy connection from DBI package
conn <- DBI::ANSI()
dbAsDate(conn, name = c("schema", "table"), date = "date", tz = "GMT",
         exec = FALSE)
```

dbColumn

Add or remove a column.

Description

Add or remove a column to/from a table.

Usage

```
dbColumn(conn, name, colname, action = c("add", "drop"),
  coltype = "integer", cascade = FALSE, display = TRUE, exec = TRUE)
```

Arguments

| | |
|---------|--------------------------------------------------------------------------------------------------|
| conn | A connection object. |
| name | A character string specifying a PostgreSQL table name. |
| colname | A character string specifying the name of the column |
| action | A character string specifying if the column is to be added ("add", default) or removed ("drop"). |
| coltype | A character string indicating the type of the column, if action = "add". |
| cascade | Logical. Whether to drop foreign key constraints of other tables, if action = "drop". |
| display | Logical. Whether to display the query (defaults to TRUE). |
| exec | Logical. Whether to execute the query (defaults to TRUE). |

Value

TRUE if the column was successfully added or removed.

Author(s)

Mathieu Basille <basille@ufl.edu>

See Also

The PostgreSQL documentation: <http://www.postgresql.org/docs/current/static/sql-altertable.html>

Examples

```
## examples use a dummy connection from DBI package
conn<-DBI::ANSI()
## Add an integer column
dbColumn(conn, name = c("schema", "table"), colname = "field", exec = FALSE)
## Drop a column (with CASCADE)
dbColumn(conn, name = c("schema", "table"), colname = "field", action = "drop",
  cascade = TRUE, exec = FALSE)
```

| | |
|-----------|-----------------------------------|
| dbComment | <i>Comment table/view/schema.</i> |
|-----------|-----------------------------------|

Description

Comment on a table, a view or a schema.

Usage

```
dbComment(conn, name, comment, type = c("table", "view", "schema"),
  display = TRUE, exec = TRUE)
```

Arguments

| | |
|---------|------------------------------------------------------------------------|
| conn | A connection object. |
| name | A character string specifying a PostgreSQL table, view or schema name. |
| comment | A character string specifying the comment. |
| type | The type of the object to comment, either "table", "view", or "schema" |
| display | Logical. Whether to display the query (defaults to TRUE). |
| exec | Logical. Whether to execute the query (defaults to TRUE). |

Value

TRUE if the comment was successfully applied.

Author(s)

Mathieu Basille <basille@ufl.edu>

See Also

The PostgreSQL documentation: <http://www.postgresql.org/docs/current/static/sql-comment.html>

Examples

```
## examples use a dummy connection from DBI package
conn<-DBI::ANSI()
dbComment(conn, name = c("schema", "table"), comment = "Comment on a view.",
  type = "view", exec = FALSE)
dbComment(conn, name = "test_schema", comment = "Comment on a schema.", type = "schema",
  exec = FALSE)
```

| | |
|--------|--------------------------------|
| dbDrop | <i>Drop table/view/schema.</i> |
|--------|--------------------------------|

Description

Drop a table, a view or a schema.

Usage

```
dbDrop(conn, name, type = c("table", "schema", "view", "materialized view"),
        ifexists = FALSE, cascade = FALSE, display = TRUE, exec = TRUE)
```

Arguments

| | |
|----------|-------------------------------------------------------------------------------------------|
| conn | A connection object. |
| name | A character string specifying a PostgreSQL table, schema, or view name. |
| type | The type of the object to drop, either "table", "schema", "view", or "materialized view". |
| ifexists | Do not throw an error if the object does not exist. A notice is issued in this case. |
| cascade | Automatically drop objects that depend on the object (such as views). |
| display | Logical. Whether to display the query (defaults to TRUE). |
| exec | Logical. Whether to execute the query (defaults to TRUE). |

Value

TRUE if the table/schema/view was successfully dropped.

Author(s)

Mathieu Basille <basille@uf1.edu>

See Also

The PostgreSQL documentation: <http://www.postgresql.org/docs/current/static/sql-droptable.html>, <http://www.postgresql.org/docs/current/static/sql-dropview.html>, <http://www.postgresql.org/docs/current/static/sql-dropschema.html>

Examples

```
## examples use a dummy connection from DBI package
conn<-DBI::ANSI()
dbDrop(conn, name = c("schema", "view_name"), type = "view", exec = FALSE)
dbDrop(conn, name = "test_schema", type = "schema", cascade = "TRUE", exec = FALSE)
```

dbIndex

*Create an index.***Description**

Defines a new index on a PostgreSQL table.

Usage

```
dbIndex(conn, name, colname, idxname, unique = FALSE, method = c("btree",
  "hash", "rtree", "gist"), display = TRUE, exec = TRUE)
```

Arguments

| | |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| conn | A connection object. |
| name | A character string specifying a PostgreSQL table name. |
| colname | A character string specifying the name of the column to which the key will be associated. |
| idxname | A character string specifying the name of the index to be created. By default, this is the name of the table (without the schema) suffixed by <code>_idx</code> . |
| unique | Logical. Causes the system to check for duplicate values in the table when the index is created (if data already exist) and each time data is added. Attempts to insert or update data which would result in duplicate entries will generate an error. |
| method | The name of the method to be used for the index. Choices are "btree", "hash", "rtree", and "gist". The default method is "btree", although "gist" should be the index of choice for Post GIS spatial types (geometry, geography, raster). |
| display | Logical. Whether to display the query (defaults to TRUE). |
| exec | Logical. Whether to execute the query (defaults to TRUE). |

Value

TRUE if the index was successfully created.

Author(s)

Mathieu Basille <basille@ufl.edu>

See Also

The PostgreSQL documentation: <http://www.postgresql.org/docs/current/static/sql-createindex.html>; the PostGIS documentation for GiST indexes: http://postgis.net/docs/using_postgis_dbmanagement.html#id541286

Examples

```
## examples use a dummy connection from DBI package
conn<-DBI::ANSI()
dbIndex(conn,name = c("schema", "table"), colname = "geom", method = "gist",
  exec = FALSE)
```

| | |
|----------|---------------------------------|
| dbSchema | <i>Check and create schema.</i> |
|----------|---------------------------------|

Description

Checks the existence, and if necessary, creates a schema.

Usage

```
dbSchema(conn, name, display = TRUE, exec = TRUE)
```

Arguments

| | |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| conn | A connection object (required, even if <code>exec = FALSE</code>). |
| name | A character string specifying a PostgreSQL schema name. |
| display | Logical. Whether to display the query (defaults to <code>TRUE</code>). |
| exec | Logical. Whether to execute the query (defaults to <code>TRUE</code>). Note: if <code>exec = FALSE</code> , the function still checks the existence of the schema, but does not create it if it does not exist. |

Value

`TRUE` if the schema exists (whether it was already available or was just created).

Author(s)

Mathieu Basille <basille@uf1.edu>

See Also

The PostgreSQL documentation: <http://www.postgresql.org/docs/current/static/sql-createschema.html>

Examples

```
## Not run:
  dbSchema(name = "schema", exec = FALSE)

## End(Not run)
```

`dbTableInfo`*Get information about table columns.*

Description

Get information about columns in a PostgreSQL table.

Usage

```
dbTableInfo(conn, name, allinfo = FALSE)
```

Arguments

| | |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <code>conn</code> | A connection object to a PostgreSQL database. |
| <code>name</code> | A character string specifying a PostgreSQL schema (if necessary), and table or view name (e.g., <code>name = c("schema", "table")</code>). |
| <code>allinfo</code> | Logical, Get all information on table? Default is column names, types, nullable, and maximum length of character columns. |

Value

data frame

Author(s)

David Bucklin <dbucklin@ufl.edu>

Examples

```
## Not run:  
dbTableInfo(conn, c("schema", "table"))  
  
## End(Not run)
```

`dbVacuum`*Vacuum.*

Description

Performs a VACUUM (garbage-collect and optionally analyze) on a table.

Usage

```
dbVacuum(conn, name, full = FALSE, verbose = FALSE, analyze = TRUE,  
          display = TRUE, exec = TRUE)
```

Arguments

| | |
|---------|-------------------------------------------------------------------------------------------------------------------------------------|
| conn | A connection object. |
| name | A character string specifying a PostgreSQL table name. |
| full | Logical. Whether to perform a "full" vacuum, which can reclaim more space, but takes much longer and exclusively locks the table. |
| verbose | Logical. Whether to print a detailed vacuum activity report for each table. |
| analyze | Logical. Whether to update statistics used by the planner to determine the most efficient way to execute a query (default to TRUE). |
| display | Logical. Whether to display the query (defaults to TRUE). |
| exec | Logical. Whether to execute the query (defaults to TRUE). |

Value

TRUE if query is successfully executed.

Author(s)

Mathieu Basille <basille@ufl.edu>

See Also

The PostgreSQL documentation: <http://www.postgresql.org/docs/current/static/sql-vacuum.html>

Examples

```
## examples use a dummy connection from DBI package
conn<-DBI::ANSI()
dbVacuum(conn, name = c("schema", "table"), full = TRUE, exec = FALSE)
```

dbWriteDataFrame

Write/read in data frame mode to/from database table.

Description

Write data.frame to database table, with column definitions, row names, and a new integer primary key column. Read back into R with dbReadDataFrame, which recreates original data frame.

Usage

```
dbWriteDataFrame(conn, name, df, overwrite = FALSE, only.defs = FALSE)

dbReadDataFrame(conn, name, df = NULL)
```

Arguments

| | |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| conn | A connection object to a PostgreSQL database |
| name | Character, schema and table of the PostgreSQL table |
| df | The data frame to write (for dbReadDataFrame, this allows to update an existing data.frame with definitions stored in the database) |
| overwrite | Logical; if TRUE, a new table (name) will overwrite the existing table (name) in the database. Note: overwriting a view must be done manually (e.g., with dbDrop). |
| only.defs | Logical; if TRUE, only the table definitions will be written. |

Details

Writing in data frame mode is only for new database tables (or for overwriting an existing one). It will save all column names as they appear in R, along with column data types and attributes. This is done by adding metadata to a lookup table in the table's schema named ".R_df_defs" (will be created if not present). It also adds two fields with fixed names to the database table: ".R_rownames" (storing the row.names of the data frame), and ".db_pkid", which is a new integer primary key. Existing columns in the data.frame matching these names will be automatically changed.

The rpostgis database table read functions dbReadDataFrame and pgGetGeom will use the meta-data created in data frame mode to recreate a data.frame in R, if it is available. Otherwise, it will be imported using default RPostgreSQL::dbReadTable methods.

All Spatial*DataFrames must be written with [pgInsert](#). For more flexible writing of data.frames to the database (including all writing into existing database tables), use [pgInsert](#) with df.mode = FALSE.

Value

TRUE for successful write with dbWriteDataFrame, data.frame for dbReadDataFrame

Author(s)

David Bucklin <dbucklin@ufl.edu>

Examples

```
## Not run:
library(sp)
data(meuse)

## Write the data.frame to the database:
dbWriteDataFrame(conn, name = "meuse_data", df = meuse)

## Reads it back into a different object:
me2 <- dbReadDataFrame(conn, name = "meuse_data")

## Check equality:
all.equal(meuse, me2)
## Should return TRUE.

## End(Not run)
```

| | |
|---------------|-------------------------------------------------------------|
| pgGetBoundary | <i>Retrieve bounding envelope of geometries or rasters.</i> |
|---------------|-------------------------------------------------------------|

Description

Retrieve bounding envelope (rectangle) of all geometries or rasters in a PostGIS table.

Usage

```
pgGetBoundary(conn, name, geom = "geom")
```

Arguments

| | |
|------|--------------------------------------------------------------------------------------------------------------------------------|
| conn | A connection object to a PostgreSQL database |
| name | A character string specifying a PostgreSQL schema and table/view name holding the geometry (e.g., name = c("schema", "table")) |
| geom | character, Name of the column in name holding the geometry/(geography) or raster object (Default = "geom") |

Value

SpatialPolygon

Author(s)

David Bucklin <dbucklin@ufl.edu>

Examples

```
## Not run:
pgGetBoundary(conn, c("schema", "polys"), geom = "polygon")
pgGetBoundary(conn, c("schema", "rasters"), geom = "rast")

## End(Not run)
```

| | |
|-----------|---------------------------------------------------------------------------|
| pgGetGeom | <i>Load a PostGIS geometry from a PostgreSQL table/view/query into R.</i> |
|-----------|---------------------------------------------------------------------------|

Description

Retrieve point, linestring, or polygon geometries from a PostGIS table/view/query, and convert it to an R sp object (Spatial* or Spatial*DataFrame).

Usage

```
pgGetGeom(conn, name, geom = "geom", gid = NULL, other.cols = TRUE,
  clauses = NULL, query = NULL)
```

Arguments

| | |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>conn</code> | A connection object to a PostgreSQL database |
| <code>name</code> | A character string specifying a PostgreSQL schema and table/view name holding the geometry (e.g., <code>name = c("schema", "table")</code>) |
| <code>geom</code> | The name of the geometry/(geography) column. (Default = "geom") |
| <code>gid</code> | Name of the column in name holding the IDs. Should be unique if additional columns of unique data are being appended. <code>gid=NULL</code> (default) automatically creates a new unique ID for each row in the <code>sp</code> object. |
| <code>other.cols</code> | Names of specific columns in the table to retrieve, in a character vector (e.g. <code>other.cols=c("col1", "col2")</code> .) The default (<code>other.cols = TRUE</code>) is to attach all columns in a <code>Spatial*DataFrame</code> . Setting <code>other.cols=FALSE</code> will return a Spatial-only object (no data frame). |
| <code>clauses</code> | character, additional SQL to append to modify select query from table. Must begin with an SQL clause (e.g., "WHERE ...", "ORDER BY ...", "LIMIT ..."); see below for examples. |
| <code>query</code> | character, a full SQL query including a geometry column. For use with query mode only (see details). |

Details

The query mode version of `pgGetGeom` allows the user to enter a complete SQL query (`query`) that returns a Geometry column, and save the query as a new view (`name`) if desired. If (`name`) is not specified, a temporary view with name `".rpostgis_TEMPview"` is used only within the function execution. In this mode, the other arguments can be used normally to modify the `Spatial*` object returned from the query.

Value

`sp-class` (`SpatialPoints*`, `SpatialMultiPoints*`, `SpatialLines*`, or `SpatialPolygons*`)

Author(s)

David Bucklin <dbucklin@uf1.edu>

Mathieu Basille <basille@uf1.edu>

Examples

```
## Not run:
## Retrieve a Spatial*DataFrame with all data from table
## 'schema.tablename', with geometry in the column 'geom'
pgGetGeom(conn, c("schema", "tablename"))
## Return a Spatial*DataFrame with columns c1 & c2 as data
pgGetGeom(conn, c("schema", "tablename"), other.cols = c("c1", "c2"))
## Return a Spatial*-only (no data frame),
## retaining id from table as rownames
pgGetGeom(conn, c("schema", "tablename"), gid = "table_id",
  other.cols = FALSE)
## Return a Spatial*-only (no data frame),
## retaining id from table as rownames and with a subset of the data
pgGetGeom(conn, c("schema", "roads"), geom = "roadgeom", gid = "road_ID",
  other.cols = FALSE, clauses = "WHERE field = 'highway'")
## Query mode
```

```

pgGetGeom(conn, query = "SELECT r.gid as id, ST_Buffer(r.geom, 100) as geom
                        FROM
                          schema.roads r,
                          schema.adm_boundaries b
                        WHERE
                          ST_Intersects(r.geom, b.geom);")

## End(Not run)

```

pgGetRast

Load raster from PostGIS database.

Description

Retrieve rasters from a PostGIS table.

Usage

```
pgGetRast(conn, name, rast = "rast", bands = 1, boundary = NULL)
```

Arguments

| | |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| conn | A connection object to a PostgreSQL database |
| name | A character string specifying a PostgreSQL schema and table/view name holding the geometry (e.g., name = c("schema", "table")) |
| rast | Name of the column in name holding the raster object |
| bands | Index number(s) for the band(s) to retrieve (defaults to 1). The special case (bands = TRUE) returns all bands in the raster. |
| boundary | sp object or numeric. A Spatial* object, whose bounding box will be used to select the part of the raster to import. Alternatively, four numbers (e.g. c([top], [bottom], [right], [left])) indicating the projection-specific limits with which to clip the raster. boundary = NULL (default) will return the full raster. |

Value

RasterLayer

Author(s)

David Bucklin <dbucklin@uf1.edu>

Examples

```

## Not run:
pgGetRast(conn, c("schema", "tablename"))
pgGetRast(conn, c("schema", "DEM"), digits = 9, boundary = c(55,
  50, 17, 12))

## End(Not run)

```

pgInsert

*Inserts data into a PostgreSQL table.***Description**

This function takes a take an R `sp` object (`Spatial*` or `Spatial*DataFrame`), or a regular `data.frame`, and performs the database insert (and table creation, when the table doesn't exist) on the database.

Usage

```
pgInsert(conn, name, data.obj, geom = "geom", df.mode = FALSE,
  partial.match = FALSE, overwrite = FALSE, new.id = NULL,
  row.names = FALSE, upsert.using = NULL, alter.names = FALSE,
  encoding = NULL, return.pgi = FALSE, df.geom = NULL, geog = FALSE)
```

```
## S3 method for class 'pgi'
print(x, ...)
```

Arguments

| | |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>conn</code> | A connection object to a PostgreSQL database |
| <code>name</code> | A character string specifying a PostgreSQL schema and table name (e.g., <code>name = c("schema", "table")</code>). If not already existing, the table will be created. If the table already exists, the function will check if all R data frame columns match database columns, and if so, do the insert. If not, the insert will be aborted. The argument <code>partial.match</code> allows for inserts with only partial matches of data frame and database column names, and <code>overwrite</code> allows for overwriting the existing database table. |
| <code>data.obj</code> | A <code>Spatial*</code> or <code>Spatial*DataFrame</code> , or <code>data.frame</code> |
| <code>geom</code> | character string. For <code>Spatial*</code> datasets, the name of geometry/(geography) column in the database table. (existing or to be created; defaults to "geom"). |
| <code>df.mode</code> | Logical; Whether to write the (Spatial) data frame in data frame mode (preserving data frame column attributes and <code>row.names</code>). A new table must be created with this mode (or <code>overwrite</code> set to <code>TRUE</code>), and the <code>row.names</code> , <code>alter.names</code> , and <code>new.id</code> arguments will be ignored (see dbWriteDataFrame for more information). |
| <code>partial.match</code> | Logical; allow insert on partial column matches between data frame and database table. If <code>TRUE</code> , columns in R data frame will be compared with the existing database table name. Columns in the data frame that exactly match the database table will be inserted into the database table. |
| <code>overwrite</code> | Logical; if true, a new table (name) will overwrite the existing table (name) in the database. Note: overwriting a view must be done manually (e.g., with dbDrop). |
| <code>new.id</code> | Character, name of a new sequential integer ID column to be added to the table for insert (for spatial objects without data frames, this column is created even if left <code>NULL</code> and defaults to the name "gid"). If <code>partial.match = TRUE</code> and the column does not exist in the database table, it will be discarded. |
| <code>row.names</code> | Whether to add the data frame row names to the database table. Column name will be <code>'R_rownames'</code> . |

| | |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>upsert.using</code> | Character, name of the column(s) in the database table or constraint name used to identify already-existing rows in the table, which will be updated rather than inserted. The column(s) must have a unique constraint already created in the database table (e.g., a primary key). Requires PostgreSQL 9.5+. |
| <code>alter.names</code> | Logical, whether to make database column names DB-compliant (remove special characters/capitalization). Default is FALSE. (This must be set to FALSE to match with non-standard names in an existing database table.) |
| <code>encoding</code> | Character vector of length 2, containing the from/to encodings for the data (as in the function <code>iconv</code>). For example, if the dataset contain certain latin characters (e.g., accent marks), and the database is in UTF-8, use <code>encoding = c("latin1", "UTF-8")</code> . Left NULL, no conversion will be done. |
| <code>return.pgi</code> | Whether to return a formatted list of insert parameters (i.e., a <code>pgi</code> object; see function details.) |
| <code>df.geom</code> | Character vector, name of a character column in an R data.frame storing PostGIS geometries, this argument can be used to insert a geometry stored as character type in a data.frame (do not use with <code>Spatial*</code> data types). If only the column name is used (e.g., <code>df.geom = "geom"</code>), the column type will be a generic (GEOMETRY); use a two-length character vector (e.g., <code>df.geom = c("geom", "(POINT, 4326)")</code>) to also specify a specific PostGIS geometry type and SRID for the column. Only recommended for new tables/overwrites, since this method will change the existing column type. |
| <code>geog</code> | Logical; Whether to write the spatial data as a PostGIS 'GEOGRAPHY' type. |
| <code>x</code> | A list of class <code>pgi</code> |
| <code>...</code> | Further arguments not used. |

Details

If `new.id` is specified, a new sequential integer field is added to the data frame for insert. For `Spatial*`-only objects (no data frame), a new ID column is created by default with name `"gid"`.

If the R package `wkb` is installed, this function will use `writeWKB` for certain datasets (non-Multi types, non-Linestring), which is faster for large datasets. In all other cases the `rgeos` function `writeWKT` is used.

In the event of function or database error, the database uses `ROLLBACK` to revert to the previous state.

If the user specifies `return.pgi = TRUE`, and data preparation is successful, the function will return a `pgi` object (see next paragraph), regardless of whether the insert was successful or not. This object can be useful for debugging, or re-used as the `data.obj` in `pgInsert`; (e.g., when data preparation is slow, and the exact same data needs to be inserted into tables in two separate tables or databases). If `return.pgi = FALSE` (default), the function will return `TRUE` for successful insert and `FALSE` for failed inserts.

`pgi` objects are a list containing four character strings: (1) `in.table`, the table name which will be created or inserted into (2) `db.new.table`, the SQL statement to create the new table, (3) `db.cols.insert`, a character string of the database column names to insert into, and (4) `insert.data`, a character string of the data to insert.

Value

Returns `TRUE` if the insertion was successful, `FALSE` if failed, or a `pgi` object if specified.

Author(s)

David Bucklin <dbucklin@ufl.edu>

Examples

```
## Not run:
library(sp)
data(meuse)
coords <- SpatialPoints(meuse[, c("x", "y")])
spdf <- SpatialPointsDataFrame(coords, meuse)

## Insert data in new database table
pgInsert(conn, name = c("public", "meuse_data"), data.obj = spdf)

## The same command will insert into already created table (if all R
## columns match)
pgInsert(conn, name = c("public", "meuse_data"), data.obj = spdf)

## If not all database columns match, need to use partial.match = TRUE,
## where non-matching columns are not inserted
colnames(spdf@data)[4] <- "cu"
pgInsert(conn, name = c("public", "meuse_data"), data.obj = spdf,
        partial.match = TRUE)

## End(Not run)
```

pgListGeom

List geometries/rasters

Description

List all geometry/(geography) or raster columns available in a PostGIS database.

Usage

```
pgListGeom(conn, display = TRUE, exec = TRUE, geog = FALSE)

pgListRast(conn, display = TRUE, exec = TRUE)
```

Arguments

| | |
|---------|---------------------------------------------------------------------------------------------------|
| conn | A PostgreSQL database connection. |
| display | Logical. Whether to display the query (defaults to TRUE). |
| exec | Logical. Whether to execute the query (defaults to TRUE). |
| geog | Logical. For pgListGeom, whether to include PostGIS geography-type columns stored in the database |

Value

If `exec = TRUE`, a data frame with schema, table, geometry/(geography) or raster (for `pgListRast`) column, and geometry/(geography) type.

Author(s)

David Bucklin <dbucklin@ufl.edu>

Examples

```
## Not run:
pgListGeom(conn)

pgListRast(conn)

## End(Not run)
```

pgMakePts

Add a *POINT* or *LINESTRING* geometry field.

Description

Add a new *POINT* or *LINESTRING* geometry field.

Usage

```
pgMakePts(conn, name, colname = "geom", x = "x", y = "y", srid,
  index = TRUE, display = TRUE, exec = TRUE)

pgMakeStp(conn, name, colname = "geom", x = "x", y = "y", dx = "dx",
  dy = "dy", srid, index = TRUE, display = TRUE, exec = TRUE)
```

Arguments

| | |
|---------|------------------------------------------------------------------------------------------------------|
| conn | A connection object. |
| name | A character string specifying a PostgreSQL schema and table name (e.g., name = c("schema", "table"). |
| colname | A character string specifying the name of the new geometry column. |
| x | The name of the x/longitude field. |
| y | The name of the y/latitude field. |
| srid | A valid SRID for the new geometry. |
| index | Logical. Whether to create an index on the new geometry. |
| display | Logical. Whether to display the query (defaults to TRUE). |
| exec | Logical. Whether to execute the query (defaults to TRUE). |
| dx | The name of the dx field (i.e. increment in x direction). |
| dy | The name of the dy field (i.e. increment in y direction). |

Value

If exec = TRUE, returns TRUE if the geometry field was successfully created.

Author(s)

Mathieu Basille <basille@ufl.edu>

See Also

The PostGIS documentation for ST_MakePoint: http://postgis.net/docs/ST_MakePoint.html, and for ST_MakeLine: http://postgis.net/docs/ST_MakeLine.html, which are the main functions of the call.

Examples

```
## Examples use a dummy connection from DBI package
conn <- DBI::ANSI()

## Create a new POINT field called 'pts_geom'
pgMakePts(conn, name = c("schema", "table"), colname = "pts_geom",
  x = "longitude", y = "latitude", srid = 4326, exec = FALSE)

## Create a new LINESTRING field called 'stp_geom'
pgMakeStp(conn, name = c("schema", "table"), colname = "stp_geom",
  x = "longitude", y = "latitude", dx = "xdiff", dy = "ydiff",
  srid = 4326, exec = FALSE)
```

pgPostGIS

*Check and create PostGIS extension.***Description**

The function checks for the availability of the PostGIS extension, and if it is available, but not installed, install it. Additionally, can also install Topology, Tiger Geocoder and SFCGAL extensions.

Usage

```
pgPostGIS(conn, topology = FALSE, tiger = FALSE, sfcgal = FALSE,
  display = TRUE, exec = TRUE)
```

Arguments

| | |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| conn | A connection object (required, even if exec = FALSE). |
| topology | Logical. Whether to check/install the Topology extension. |
| tiger | Logical. Whether to check/install the Tiger Geocoder extension. Will also install extensions "fuzzystrmatch", "address_standardizer", and "address_standardizer_data_us" if all are available. |
| sfcgal | Logical. Whether to check/install the SFCGAL extension. |
| display | Logical. Whether to display the query (defaults to TRUE). |
| exec | Logical. Whether to execute the query (defaults to TRUE). |

Value

TRUE if PostGIS is installed.

Author(s)

Mathieu Basille <basille@ufl.edu>

Examples

```
## 'exec = FALSE' does not install any extension, but nevertheless
## check for available and installed extensions:
## Not run:
  pgPostGIS(con, topology = TRUE, tiger = TRUE, sfcgal = TRUE,
            exec = FALSE)

## End(Not run)
```

pgSRID

Find (or create) PostGIS SRID based on CRS object.

Description

This function takes [CRS](#)-class object and a PostgreSQL database connection (with PostGIS extension), and returns the matching SRID(s) for that CRS. If a match is not found, a new entry can be created in the PostgreSQL `spatial_ref_sys` table using the parameters specified by the CRS. New entries will be created with `auth_name = 'rpostgis_custom'`, with the default value being the next open value between 880001-889999 (a different SRID value can be entered if desired.)

Usage

```
pgSRID(conn, crs, create.srid = FALSE, new.srid = NULL)
```

Arguments

| | |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>conn</code> | A connection object to a PostgreSQL database. |
| <code>crs</code> | CRS object, created through a call to CRS . |
| <code>create.srid</code> | Logical. If no matching SRID is found, should a new SRID be created? User must have write access on <code>spatial_ref_sys</code> table. |
| <code>new.srid</code> | Integer. Optional SRID to give to a newly created SRID. If left NULL (default), the next open value of <code>srid</code> in <code>spatial_ref_sys</code> between 880001 and 889999 will be used. |

Value

SRID code (integer).

Author(s)

David Bucklin <dbucklin@ufl.edu>

Examples

```
## Not run:
drv <- dbDriver("PostgreSQL")
conn <- dbConnect(drv, dbname = "dbname", host = "host", port = "5432",
  user = "user", password = "password")
(crs <- CRS("+proj=longlat"))
pgSRID(conn, crs)
(crs2 <- CRS(paste("+proj=stere", "+lat_0=52.15616055555555 +lon_0=5.38763888888889",
  "+k=0.999908 +x_0=155000 +y_0=463000", "+ellps=bessel",
```

```

"+towgs84=565.237,50.0087,465.658,-0.406857,0.350733,-1.87035,4.0812",
"+units=m"))
pgSRID(conn, crs2, create.srid = TRUE)

## End(Not run)

```

| | |
|-------------|------------------------------------------------|
| pgWriteRast | <i>Write raster to PostGIS database table.</i> |
|-------------|------------------------------------------------|

Description

Sends R Raster* to a new PostGIS database table.

Usage

```
pgWriteRast(conn, name, raster, bit.depth = NULL, constraints = TRUE,
  overwrite = FALSE)
```

Arguments

| | |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| conn | A connection object to a PostgreSQL database |
| name | A character string specifying a PostgreSQL schema (if necessary) and table name to hold the raster (e.g., name = c("schema", "table")) |
| raster | An R RasterLayer, RasterBrick, or RasterStack |
| bit.depth | The bit depth of the raster. Will be set to 32-bit (unsigned int, signed int, or float, depending on the data) if left null, but can be specified (as character) as one of the PostGIS pixel types (see http://postgis.net/docs/RT_ST_BandPixelType.html) |
| constraints | Whether to create constraints from raster data. Recommended to leave TRUE unless applying constraints manually (see http://postgis.net/docs/RT_AddRasterConstraints.html). Note that constraint notices may print to the console, depending on the PostgreSQL server settings. |
| overwrite | Whether to overwrite the existing table (name). |

Details

RasterLayer names will be stored in an array in the column "band_names", which will be restored in R when imported with the function [pgGetRast](#).

Value

TRUE for successful import.

Author(s)

David Bucklin <dbucklin@ufl.edu>

See Also

Function follows process from http://postgis.net/docs/using_raster_dataman.html#RT_Creating_Rasters.

Examples

```
## Not run:
pgWriteRast(conn, c("schema", "tablename"), raster_name)

# basic test
r<-raster(nrows=180, ncols=360, xmn=-180, xmx=180, ymn=-90, ymx=90, vals=1)
pgWriteRast(conn, c("schema", "test"), raster = r, bit.depth = "2BUI", overwrite = TRUE)

## End(Not run)
```

roe_gps_data

Example data from a GPS tracking project

Description

Example datasets related to a GPS tracking project for roe deer in Trentino Region, Italy. Four datasets include raw data from GPS sensors (roe_gps_data), information on animals, sensors, and sensor deployments on animals (roe_sensors_animals_tables), and ancillary vector (roe_vector_geom) and raster (roe_raster) spatial datasets.

Usage

roe_gps_data

roe_sensors_animals_tables

roe_vector_geom

roe_raster

Format

roe_gps_data: A list containing five data.frames corresponding to five GPS sensors

GSM01438 data frame for sensor 01438

GSM01508 data frame for sensor 01508

GSM01511 data frame for sensor 01511

GSM01512 data frame for sensor 01512

GSM02927 data frame for sensor 02927

roe_sensors_animals_tables: A list containing three data.frames

animals data frame containing basic information on animals

gps_sensors data frame containing basic information on GPS sensors

gps_sensors_animals data frame containing information on deployment of GPS sensors on animals

roe_vector_geom: A list containing four Spatial*DataFrames

study_area SpatialPolygonsDataFrame containing boundary of study area

adm_boundaries SpatialPolygonsDataFrame containing administrative boundaries in study area

meteo_stations SpatialPointsDataFrame containing locations of weather stations in study area

roads SpatialLinesDataFrame containing representation of roads for study area

roe_raster: A list containing two RasterLayer datasets

corine06 RasterLayer depicting land cover classification in the study area

srtm_dem RasterLayer digital elevation model in the study area

Source

Urbano, F. & Cagnacci, F., eds. (2014) Spatial Database for GPS Wildlife Tracking Data: A Practical Guide to Creating a Data Management System with PostgreSQL/PostGIS and R. Springer, 257 pp. DOI: 10.1007/978-3-319-03743-1

Examples

```
data("roe_gps_data")
head(roe_gps_data$GSM01438)
data("roe_sensors_animals_tables")
roe_sensors_animals_tables$animals
data("roe_vector_geom")
if (require(sp, quietly = TRUE)) {
  plot(roe_vector_geom$adm_boundaries)
  plot(roe_vector_geom$roads, col = 'red', add = TRUE)
}
data("roe_raster")
if (require(raster, quietly = TRUE)) plot(roe_raster$srtm_dem)
```

rpostgis

R interface to a PostGIS database.

Description

'rpostgis' provides an interface between R and 'PostGIS'-enabled 'PostgreSQL' databases to transparently transfer spatial data. Both vector (points, lines, polygons) and raster data are supported in read and write modes. Also provides convenience functions to execute common procedures in 'PostgreSQL/PostGIS'. For a list of documented functions, use `library(help = "rpostgis")`.

Details

A typical session starts by establishing the connection to a working PostgreSQL database:

```
library(rpostgis) con <- dbConnect("PostgreSQL", dbname = <dbname>, host = <host>, user = <user>, password = <password>)
```

For example, this could be:

```
con <- dbConnect("PostgreSQL", dbname = "rpostgis", host = "localhost", user = "postgres", password = "postgres")
```

The next step typically involves checking if PostGIS was installed on the working database, and if not try to install it:

```
pgPostGIS(con)
```

The function should return TRUE for all pg- functions to work.

Finally, at the end of an interactive session, the connection to the database should be closed:

```
dbDisconnect(con)
```

Author(s)

Mathieu Basille (<basille@uf1.edu>) and David Bucklin (<dbucklin@uf1.edu>)

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