Package: FI (via r-universe)

September 5, 2024

Type Package

Title Provide functions for forest inventory calculations

Version 1.0

Date 2013-01-17

Description Provide functions for forest inventory calculations.
Common volumetric equations (Smalian, Newton and Huber) as well
stacking factor and form

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URL https://github.com/dvdscripter/FI

BugReports https://github.com/dvdscripter/FI/issues

Repository https://dvdscripter.r-universe.dev

RemoteUrl https://github.com/dvdscripter/fi

RemoteRef HEAD

RemoteSha 7b07d72840b0dbf5fe8afb615963d01465d9a1f7

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ff *Factor form for the given volume*

Description

This function provide correction for basic volume estimation using cylinder formulation $v = \frac{DBH^2}{4}\pi H$. Factor form is given by taking ratio between real volume and apparent volume.

Usage

```
ff(volume, dbh, height)
```

Arguments

volume	volume of a log, can be the output of volume
dbh	diameter at breast height (1.3 meters from floor)
height	commercial height, length of stem or whatever length of log you used in your estimations of cylinder volume

Value

form factor ranging form 0-1 (numeric value)

References

http://wiki.awf.forst.uni-goettingen.de/wiki/index.php/Stem_shape

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FI *Forest inventory equations and calculations with FI*

Description

That package was created because I can't find any free solution for these basic calculations also will serve as learning experience to create packages in R.

Details

Here I implement the three basic volume equations (Smalian, Newton, Huber) and form and stacking factors. From these you can gather many information about a region log volume (mean and standard deviation). Later a new package will provide volumetric equations adjust.

See Also

volume

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inventory	*Example of how object tree in* volume *function should be formated*

Description

Choice of that format follow similarity with cubmaster for simplify user translation of work (exporting old tables). Names of columns are just cosmetic, currently I use column index. All diameters mensures should rather be in centimeters and heights in meters

Format

A data frame with 17 rows and 6 variables

Details

- tree_number. unique number to identify tree information
- dbh. diameter at breast height
- total_height. total height of the tree. Unsed parameter in volume
- commercial_height. commercial height of tree. Unsed parameter in volume
- section_height. height of each section where diameter section is taken
- section_diameter. diameter in current height

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sf	*Stacking factor*

Description

Ratio between solid cubic meters of wood per stere cubic meter of stacked up wood.

Usage

```
sf(volume, height, length, depth)
```

Arguments

volume	real volume of the logs
height	height of the stack (in meters)
length	length of the stack (in meters)
depth	depth of the stack (in meters)

Value

stacking factor ranging from 0-1

References

www.eucalyptus.com.br/capitulos/ENG07.pdf

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volume	*Estimates the stem volume*

Description

`volume` uses one of the following methods (Smalian, Newton, Huber) to approximate real stem volume. Users should remember they're just approximations and sample size provide more accurate results them using different methods.

Usage

```
volume(trees, method = "smalian")
```

Arguments

trees   a data frame or matrix in format described in dataset inventory (more help
                inventory)

method   method used for estimation of the stem volume

Value

a named vector of volumes, names are defined as same as in first column

Note

Newton and Huber methods have small modifications for working just with two mensures (lower and upper diameter). Both of them use mean instead of real middle diameter.

References

http://wiki.awf.forst.uni-goettingen.de/wiki/index.php/Stem_volume

See Also

[ff](ff) [sf](sf)

Examples

```
example_data <- data.frame(tree_number = 1,
                           dhb = 5,
                           total_height = 20,
                           comercial_height = 15,
                           section_height = c(0,5,15),
                           section_diameter = 5
                           )
```

```
volume(example_data)
#
#
# A little more complex and common example
data(inventory)
volume_output <- volume(inventory)
summary(volume_output)
hist(volume_output)
```

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