# Package 'FI'

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**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

**License** GPL-3

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**NeedsCompilation** no

## R topics documented:

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ff                              *Factor form for the given volume*

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### 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](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](http://wiki.awf.forst.uni-goettingen.de/wiki/index.php/Stem_shape)

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| FI | *Forest inventory equations and calculations with FI* |
|---|---|

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## 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](volume)

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

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## 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*

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## 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* |
|---|---|

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## 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 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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