Package ‘rForest’

October 4, 2021

Type Package
Title Forest Inventory and Analysis
Version 0.1.4
Depends R (>= 3.1.2)
Imports alphashape3d, geometry, rgl, sp
Description Set of tools designed for forest inventory analysis.
License GPL (>= 2)
RoxygenNote 7.1.2
URL https://github.com/carlos-alberto-silva/rForest
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Repository CRAN
Repository/R-Forge/Project rforest
Repository/R-Forge/Revision 15
Repository/R-Forge/DateTimeStamp 2021-10-02 04:21:10
Date/Publication 2021-10-04 08:00:02 UTC
NeedsCompilation no

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Forest Inv 01  

**Description**
Forest inventory data collected in Eucalyptus spp. forest plantations. This is an example of forest inventory data used in `poly5Model`, `plotStem2d` and `plotStem3d` functions.

**Format**
A data frame with 131 rows and 5 variables.

**Details**
- *id*: unique number to identify tree information
- *hi*: height (m) of each section where diameter is taken
- *di*: diameter (cm) in *hi*
- *ht*: total height (m) of the tree
- *dbh*: diameter (cm) at breast height (e.g. 1.30 m)

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**plotStem2d**

**Description**
`plotStem2d` is used to visualize tree stems in 3D.

**Usage**
```
plotStem2d(hi, di, col)
```

**Arguments**
- `hi`, vector of measured tree *i* heights
- `di`, vector of measured tree diameters (di) at *i* heights
- `col`, stem color, e.g. "chocolate"

**Value**
Nothing, but outputs a plot.

**Author(s)**
Carlos A. Silva
plotStem3d

Examples

# Importing forest inventory data
data(ForestInv01)

# Subsetting Tree 1
tree1<-subset(ForestInv01,ForestInv01[,1]==1)
hi<-tree1$hi
di<-tree1$di

# Plotting stem 2d
plotStem2d(hi,di, col="forestgreen")

plotStem3d

3D visualization of tree stems

Description

plotStem3d is used to visualize tree stems in 3D

Usage

plotStem3d(hi,di,col,alpha)

Arguments

hi, di, vector of trees his
     vector of trees dis
col, stem color, e.g. "chocolate"
alpha, stem transparency. Set a value from 0 to 1

Value

Nothing, but outputs a plot

Author(s)

Carlos Alberto Silva

Examples

# Importing forest inventory data
data(ForestInv01)

# Subsetting Tree 1
tree1<-subset(ForestInv01,ForestInv01[,1]==1)
hi<-tree1$hi
di<-tree1$di
poly5Model

# Plotting stem 3d
plotStem3d(hi, di, alpha=1, col="forestgreen")

---

poly5Model  "Fitting a fifth-degree polynomial taper model"

Description

poly5Model is used to fit a fifth-degree polynomial taper model

Usage

poly5Model(dbh, ht, di, hi, plotxy)

Arguments

dbh,         vector of diameter at breast height
ht,          vector of measured tree heights
di,          vector of measured tree diameters at i heights
hi,          vector of measured tree i heights
plotxy,      plot the fitted model

Value

Returns a fifth-degree polynomial taper model as an object of class "lm"

Author(s)

Carlos A. Silva, Samuel P. C. Carvalho, Carine Klauberg Silva and Manoela de O. Rosa

References

Schoepfer (1966) model: fifth-degree polynomial taper model

\[ \frac{di}{dbh} = \frac{hi}{ht} + \left(\frac{hi}{ht}\right)^2 + \left(\frac{hi}{ht}\right)^3 + \left(\frac{hi}{ht}\right)^4 + \left(\frac{hi}{ht}\right)^5 \]

Examples

# Importing forest inventory data
data(ForestInv01)

# setting model parameters dbh and ht
hi<-ForestInv01[,2]
di<-ForestInv01[,3]
ht<-ForestInv01[,4]
dbh<-ForestInv01[,5]

# fitting the fifth-degree polynomial taper model
VisTaperShape3d

```r
fit <- poly5Model(dbh,ht,di,hi, plotxy=TRUE)
#grid()
```

---

VisTaperShape3d  
3-D visualization of taper models

**Description**
VisTaperShape3d is used for visualizing taper models in 3-D

**Usage**

```r
VisTaperShape3d(model,dbh,height,col, solid)
```

**Arguments**
- `model`, taper model as an object of class "lm"
- `dbh`, tree diameter at breast height, e.g. 35 cm
- `height`, tree height, e.g. 25 m
- `col`, taper color, e.g. "forestgreen"
- `solid`, if TRUE (default) returns a solid 3d model. If FALSE, returns a 3d grid model

**Value**
Nothing, but outputs a plot

**Author(s)**
Carlos Alberto Silva and Joao Paulo Sardo Madi

**Examples**

```r
# Importing forest inventory data
data(ForestInv01)

# setting model parameters dbh and ht
hi<-ForestInv01[,2]
di<-ForestInv01[,3]
ht<-ForestInv01[,4]
dbh<-ForestInv01[,5]

# fitting the fifth-degree polynomial taper model
fit <- poly5Model(dbh,ht,di,hi, plotxy=TRUE)

dbh<-30 # cm
height<-25 # m
model<-fit
```
library(rgl)
# Plotting the taper model in 3-D
VisTaperShape3d(fit,dbh,height,col="forestgreen",solid=TRUE)
box3d()
grid3d(c("x+","y+"))
aspect3d(0.3,0.3,1)
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