TapeR: Flexible stem taper modelling

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1 Introduction

The `TapeR` package implements methods described in (Kublin et al., 2013).

If `R` is running, the `TapeR` package can be installed by typing

```
> install.packages("TapeR")
```

into the console[1].

The command

```
> library(TapeR)
```

loads the package into the current workspace. We can get an overview of the packages' contents by typing

```
> ?TapeR
```

2 Using the TapeR functions

2.1 Fitting a taper model

A taper model can be fit to measured pairs of diameter and corresponding heights. Typically, those data are recorded for regular stem sections but the data can also be availabe at irregular distances. Important is for the method implemented in this packages is that the stem height is available too. We will load some example data and fit a taper model. Note that in real applications, the dataset must be considerably bigger in order to provide reliable taper models that are valid over larger spatial extents. For example, the data set `SK.par.lme` provides the taper model parameters based on 338 Norway spruce trees in Germany.

```
> #load example data
> data(DxHx.df)
> #prepare the data (could be defined in the function directly)
> Id = DxHx.df[,"Id"]
> x = DxHx.df[,"Hx"]/DxHx.df[,"Ht"]#calculate relative heights
> y = DxHx.df[,"Dx"]
> #plot the example data
> plot(x,y,pch=as.character(Id),xlab="Relative height (m)", ylab="Diameter (cm)")
> #define the relative knot positions and order of splines
>
> knt_x = c(0.0, 0.1, 0.75, 1.0) # B-Spline knots: fix effects
> ord_x = 4 # ord = order (4 = cubic)
```

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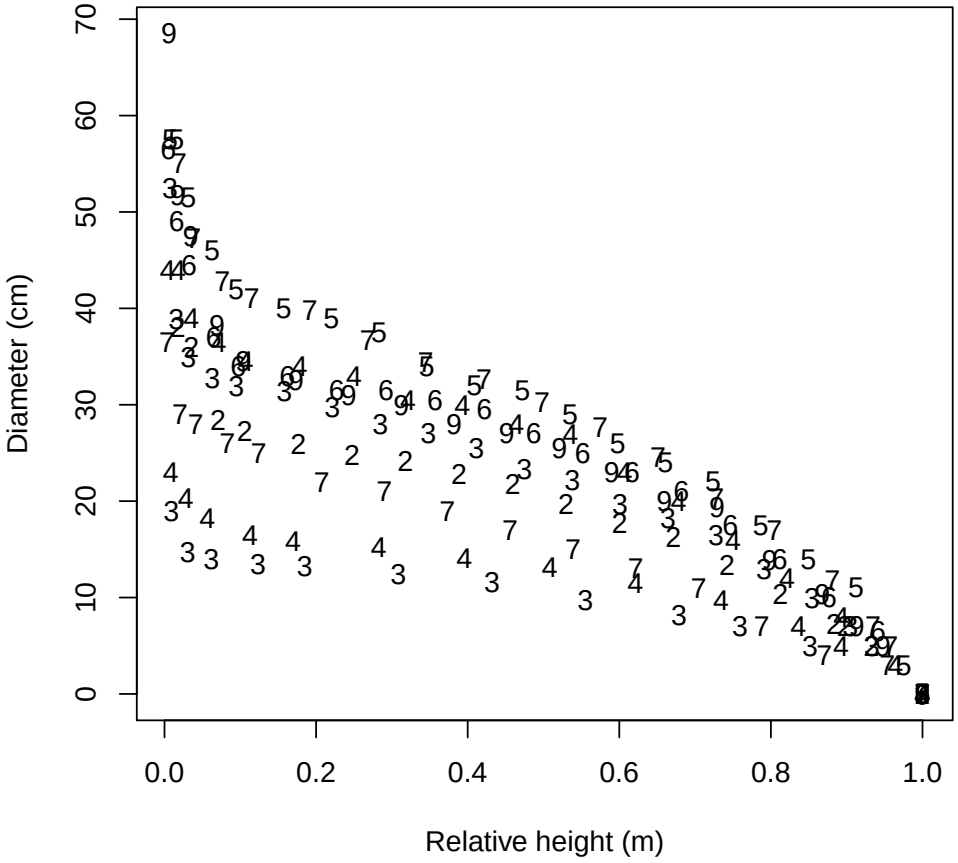
[1]The character ">" is not part of the command. A working Internet connection is required.

```
> knt_z = c(0.0, 0.1, 1.0); ord_z = 4 # B-Spline knots: rnd effects
> #fit the model
> taper.model <- TapeR_FIT_LME.f(Id, x, y, knt_x, ord_x, knt_z, ord_z,
+ IdKOVb = "pdSymm")
> #save model parameters for documentation or dissimination
> #parameters can be load()-ed and used to predict the taper
> #or volume using one or several measured dbh
> spruce.taper.pars <- taper.model$par.lme
> #save(spruce.taper.pars, file="spruce.taper.pars.rdata")##uncomment to save
```



References

Kublin, E., Breidenbach, J., Kändler, G. (2013): *A flexible stem taper and volume prediction method based on mixed-effects B-spline regression.* Eur J For Res, 132:983-997.