Introduction to the **mountainplot** package

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1 Abstract

The `mountainplot` package provide an extension to the `lattice` package that allows for the consutruction of mountain plots, which are also known as folded empirical cumulative distribution plots.

2 Setup

Load the package and use the `singer` data from the `lattice` package. Combine the first and second parts of each voice part into a new variable called `section`.

```
library("mountainplot")
data(singer, package = "lattice")
parts <- within(singer, {
section <- voice.part
section <- gsub(" 1", "", section)
section <- gsub(" 2", "", section)
section <- factor(section)
})
# Change levels to logical ordering
levels(parts$section) <- c("Bass","Tenor","Alto","Soprano")
```

3 Mountain plot

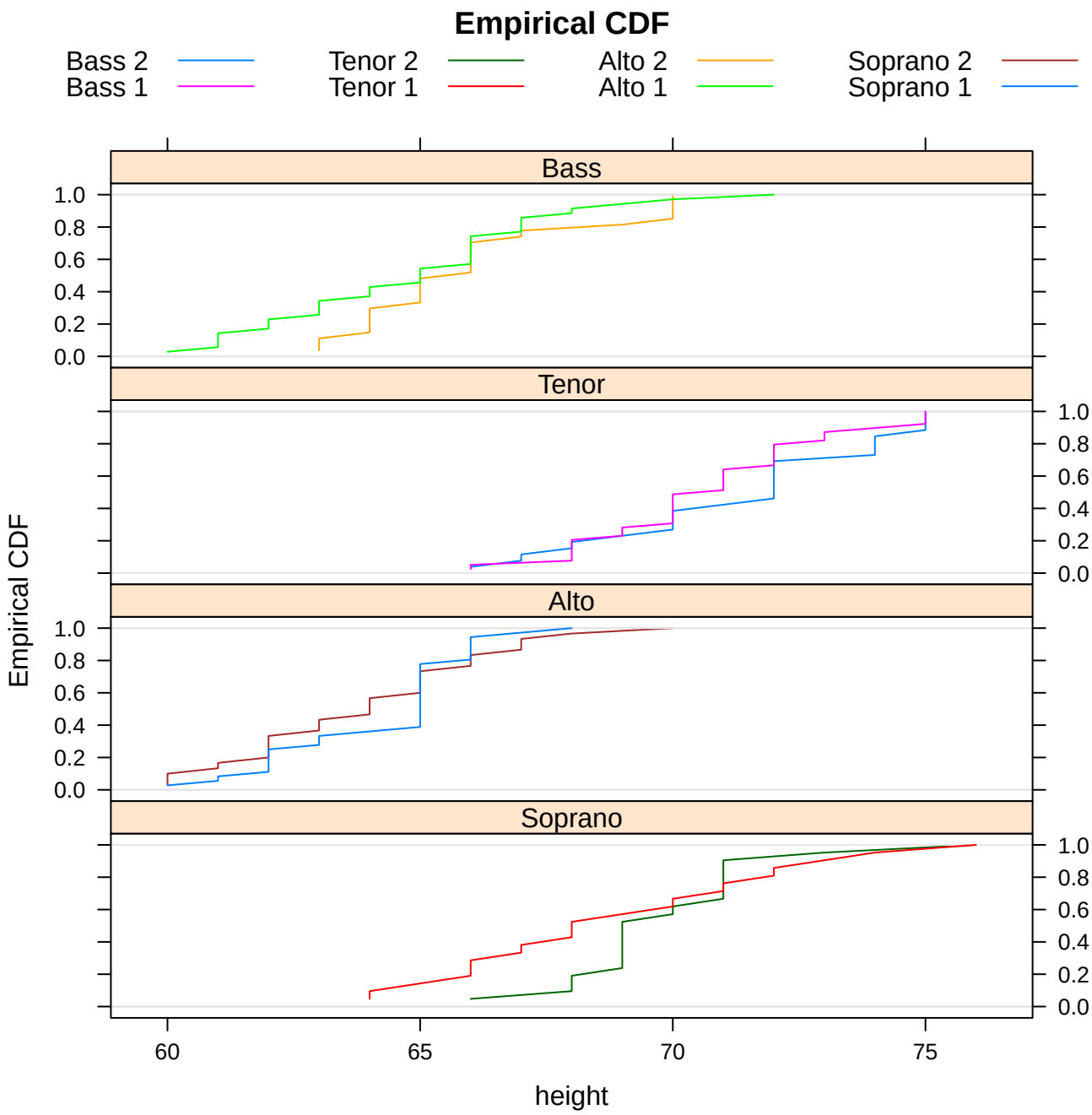
A mountainplot, or folded empircal cumulative distribution function, is similar to an ordinary empirical CDF, but once the cumulative probability reaches 0.50, the CDF is inverted, decreasing back down instead of continuing upward.

Here is an example of the traditional empirical CDFs.

```
require(latticeExtra) # for ecdfplot
```

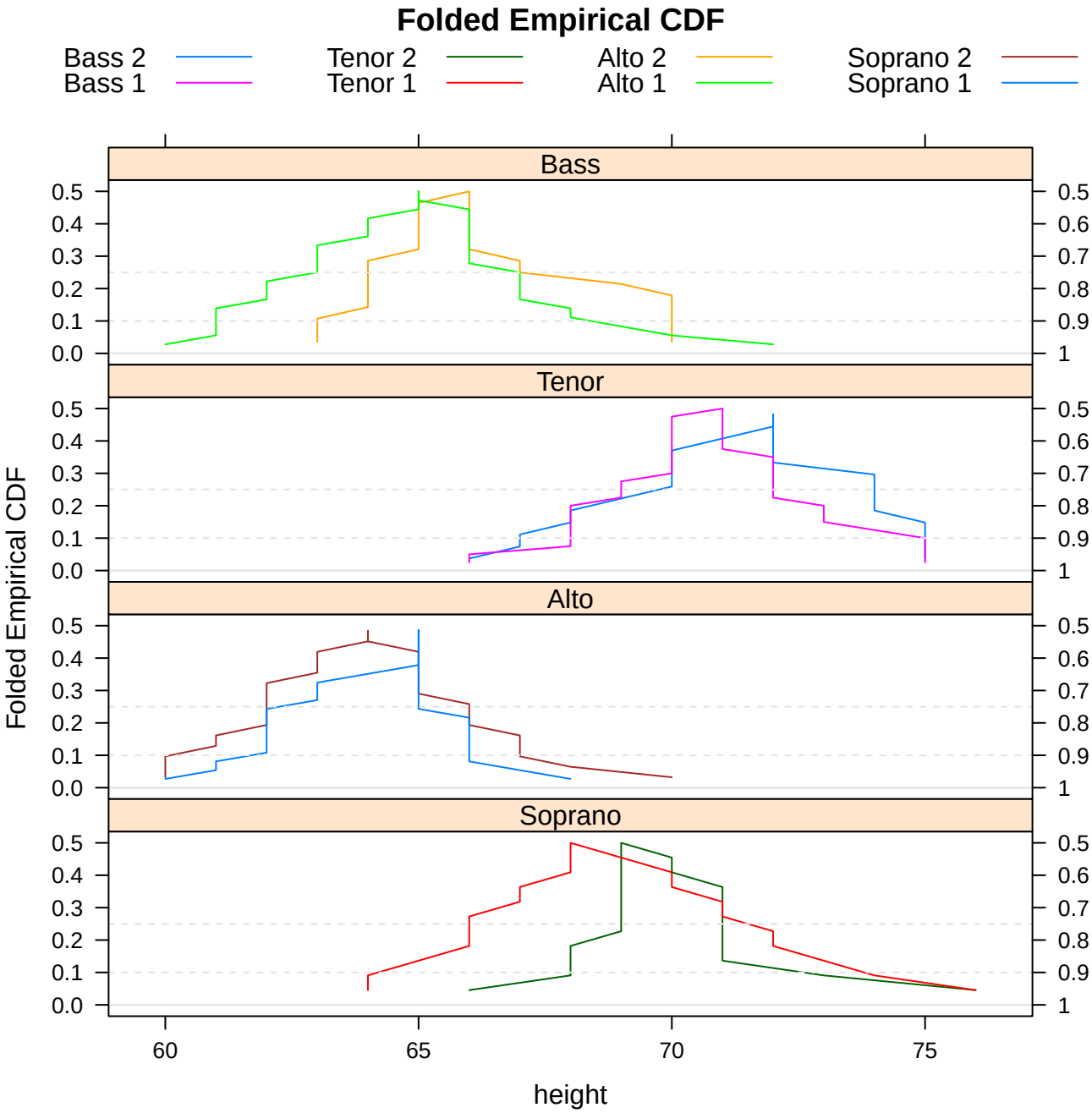
```
## Loading required package:  latticeExtra
## Loading required package:  RColorBrewer
## Loading required package:  lattice
```

```
ecdfplot(~height|section, data = parts, groups=voice.part, type=l,
         layout=c(1,4),
         main="Empirical CDF",
         auto.key=list(columns=4), as.table=TRUE)
```



Here is a view of the same data shown with a mountain plot.

```
mountainplot(~height|section, data = parts,
             groups=voice.part, type=l,
             layout=c(1,4),
             main="Folded Empirical CDF",
             auto.key=list(columns=4), as.table=TRUE)
```



Monti (1995) suggestys that a mountain plot is helpful with exploring data and makes it easier to:

1. Determine the median.
2. Determine the range.
3. Determine central or tail percentiles of any specified value.
4. Observe outliers.
5. Observe unusual gaps in the data.
6. Examine the data for symmetry.
7. Compare multiple distributions.
8. Visually examine the sample size.

Additionally, the area under the curve is equal to the mean absolute deviation (MAD) (Xue & Titterington,

2011).

4 Appendix

Session information:

- R version 3.1.3 (2015-03-09), `x86_64-w64-mingw32`
- Base packages: base, datasets, grDevices, graphics, methods, stats, utils
- Other packages: RColorBrewer 1.1-2, knitr 1.10.5, lattice 0.20-31, latticeExtra 0.6-26, mountainplot 1.1
- Loaded via a namespace (and not attached): evaluate 0.7, formatR 1.2, grid 3.1.3, highr 0.5, magrittr 1.5, stringi 0.5-2, stringr 1.0.0, tools 3.1.3

5 Bibliography

K. L. Monti. (1995) Folded empirical distribution function curves-mountain plots. *The American Statistician*, 49, 342–345. http://www.jstor.org/stable/2684570

J. H. Xue and D. M. Titterington, (2011). The p-folded cumulative distribution function and the mean absolute deviation from the p-quantile. *Statistics & Probability Letters*, 81, 1179-1182. http://dx.doi.org/10.1016/j.spl.2011.03.014