

# Understanding and Applying Transformation Models

*Torsten Hothorn\**

## **Abstract**

The **mlt** package implements maximum likelihood estimation in the class of conditional transformation models. Based on a suitable explicit parameterization of the unconditional or conditional transformation function using infrastructure from package **basefun**, we show how one can define, estimate, and compare a cascade of increasingly complex transformation models in the maximum likelihood framework. Models for the unconditional or conditional distribution function of any univariate response variable are set up and estimated in the same computational framework simply by choosing an appropriate transformation function and parameterization thereof. As it is computationally cheap to evaluate the distribution function, models can be estimated by maximization of the exact likelihood, especially in the presence of random censoring or truncation. The relatively dense high-level implementation in the R system for statistical computing allows generalization of many established implementations of linear transformation models, such as the Cox model or other parametric models for the analysis of survival or ordered categorical data, to the more complex situations illustrated in this talk.

Slides: [http://user.math.uzh.ch/hothorn/talks/mlt\\_Linz\\_2020.pdf](http://user.math.uzh.ch/hothorn/talks/mlt_Linz_2020.pdf)

\* University of Zurich, Switzerland