

## Modelling Twin Survival Data under LTRC

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### Abstract

Twin studies are useful for assessing the relative importance of genetic or heritable component from the environmental component. In this paper we develop a methodology to study the heritability of age-of-onset traits, with application to analysis of twin survival data. Due to limited period of observation, the data can be left truncated and right censored (LTRC). Under the LTRC setting we propose a genetic mixed linear model, which allows general fixed predictors and random components to capture genetic and environmental effects. Inferences are based upon the hierarchical-likelihood (h-likelihood), which provides a statistically efficient and unified framework for various random-effect models. We also propose a simple and fast computation method for dealing with large data sets. The method is illustrated by the survival data from the Swedish Twin Registry. Finally, a simulation study is carried out to evaluate its performance.

*Keywords* : Environment effect; Frailty models; Genetic effect; Hierarchical-likelihood; Left truncation and right censoring; Mixed linear models; Random effects.

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