

A METHOD FOR SURVIVAL DATA WITH FRAILITY

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In survival analysis individuals may be heterogeneous, even after allowing for the effect of covariates. Such heterogeneity is often modelled as a random effect, known as the frailty, and is usually incorporated by using a mixture approach.

In this work bivariate survival times are modelled considering frailty acting as a multiplying factor over time. Thus the ratio of survival times does not involve the frailty component and as a result assumptions do not have to be made about frailty distribution. Diagnostic plots and maximum likelihood estimates based on the ratio method are derived for Weibull and lognormal underlying survival times. The methodology is extended to the multivariate case using an approach based on orthogonal contrasts.

Some properties of the ratio method in the presence of censored observations are investigated and some possible extensions of the method are considered.

A data set is used to illustrate the ratio method.