A wrapper routine for Maximum Likelihood estimation in parametric regression models for survival analysis in R

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Abstract: In recent years, it has been proposed flexible lifetime distributions capable to fit to survival data described by bathtub-shaped hazard functions. A convenient way to carry out this modelling process is employing maximum likelihood estimation (MLE) to fit the parameters. This technique is preferred over other available methods since it generates consistent, asymptotically normal and invariant estimators [1]. However, likelihood maximization usually involves cumbersome derivatives and it is necessary to build (log-)likelihood functions every time in a computing language in order to obtain approximate numerical solutions. On the other hand, a wide variety of novel lifetime distributions are not yet available in some statistical software for general use, and hence many of them are not available in such a way it is possible to fit linear regression models of their parameters. Lately, we developed `maxlogL` [3], a routine which performs log-likelihood maximization of any density function implemented in R. Optimization is based on different box constrained quasi-Newton algorithms (BFGS/L-BFGS) or in a differential evolutionary algorithm (`DEoptim`) for those cases where there are regularity problems related with smoothness of the derivatives. Both methods aforesaid were prevoiusly implemented in `base` package [5] and `DEoptim` package [2]. Additionally, standard errors are estimated computing Fisher information matrix with the Hessian or via Bootstrap. Here, we propose the implementation of a wrapper computational procedure for parameters estimation with covariates with a linear predictor based on `maxlogL` capabilities .

References

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