LOG HAZARD REGRESSION

by

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Abstract

We propose using regression splines to estimate the two log marginal hazard functions of bivariate survival times, where each time could be censored. The method is a modified version of Kooperberg, Stone and Truong's (JASA, 1995) hazard regression for estimating a univariate survival time. We derive an approach to find standard errors for estimates of the difference of the log hazard functions. The approach is inspired by Wei, Lin, and Weissfeld (JASA, 1989).

We also propose procedures for testing the four hypotheses that the marginals follow an exponential or Weibull distribution and that the two failure times have the same distribution or have proportional hazards.

A simulation study is conducted to assess the performance of our estimates and test procedures. We study the effects of the censoring rates, correlation levels, and number of knots. The regression is applied to the data set of the Diabetic Retinopathy Study (Diabetic Retinopathy Study Research Group, 1981). Our analysis for the data set matches study results of Huster, Brookmeyer, and Self (1989).

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