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A permutation test for the two-sample right-censored model

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Abstract

The paper presents a novel approach to solve a classical two-sample problem with right-censored data. As a result, an efficient procedure for verifying equality of the two survival curves is developed. It generalizes, in a natural manner, a well-known standard, that is, the log-rank test. Under the null hypothesis, the new test statistic has an asymptotic Chi-square distribution with one degree of freedom, while the corresponding test is consistent for a wide range of the alternatives. On the other hand, to control the actual Type I error rate when sample sizes are finite, permutation approach is employed for the inference. An extensive simulation study shows that the new test procedure improves upon classical solutions and popular recent developments in the field. An analysis of the real datasets is included. A routine, written in R, is attached as Supplementary Material.

Keywords Incomplete observations · Laguerre polynomials · Permutation test · Survival analysis · Two-sample test · Weighted log-rank test

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s10463-020-00777-w) contains supplementary material, which is available to authorized users.

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