

## A class of weighted log–rank test statistics for interval–censored data

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Comparison of two or more samples when data are censored is one of the main topics in survival studies. The complexity of the censoring mechanism has led to the development of new statistical methods. While many tests have been proposed when data are right-censored, research for interval-censored data is still ongoing. Peto and Peto [1] were among the first authors to propose testing methods for interval-censored data. They extend the Wilcoxon test and the log-rank test to interval-censored data and use a permutation procedure to avoid the difficulty of finding the distribution of the corresponding test statistics. Finkelstein [2] derives the log-rank test as a score statistic of a proportional hazards model. This author assumes grouped continuous data and uses the observed Fisher information matrix, instead of the permutation distribution, to obtain the asymptotic distribution of the test statistic. In this paper, we extend the  $G^\rho$  and  $G^{\rho,\lambda}$  families of tests first proposed by Fleming and Harrington [3] and widely used in survival analysis applications with right-censored data. We derive the class of tests  $G^\rho$  as a family of score statistics in a general regression model for discrete data. Following ideas of Fay [4], [5] and Fay and Shih [6], we obtain two equivalent expressions for the  $G^\rho$  family: as a weighted log-rank form and as a linear form with a term for each individual. We show how to compute the covariance matrix by using either the observed Fisher information or a permutation procedure. The permutation approach is less trouble to implement than the likelihood approach and it applies to discrete and continuous data. Finally, we define the  $G^{\rho,\lambda}$  family for interval-censored data as a natural generalization of the  $G^\rho$  family.

## References

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