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Probabilities instead of hazards in survival analysis

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Abstract

Survival analysis is a set of tools used to analyze time between events. It is often used in biostatistics, economics and actuarial mathematics. One of the most fundamental concepts of survival analysis is the hazard function, which tells us the rate at which events are happening at a given moment. The hazard function is widely used, for example, to describe the difference in effectiveness of different types of medical treatment. In this thesis, it is pointed out that the hazard function is difficult to interpret: there are many examples of researchers mistaking the hazard function for a probability, even though it is only a rate. There is, however, an alternative to the hazard function: the instantaneous geometric rate. This measure describes the actual probability of the event happening, and it is therefore easy to interpret. A regression method for the instantaneous geometric rate is presented and then applied to real biostatistical data.

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