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Relationship between the Proportional Hazards Model and the Proportional Mean Residual Life Model

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Abstract

Due to its numerous but important applications, the mean residual life (MRL) has seized the curiosity of several researchers both in theory and in practice. It is defined as the remaining life expectancy of a subject given its survival up to time t . As an alternative approach to the Cox proportional hazards (PH) model in studying the relationship of survival times with the subject's explanatory covariates, the proportional mean residual life (PMRL) model was introduced in the literature. These two models are the same in form in that the function of interest is expressed in terms of the product of its baseline function and some proportionality constant. The only difference is that the latter directly models the MRL instead of the hazard. In this paper, the relationship between these two models is investigated analytically and illustrated by actual data. General relationships between the hazard function and mean residual life function are presented as well.

Keywords: *Proportional mean residual life model, proportional hazards model, life expectancy, hazard function, censoring*