ESTIMATION OF GAP-TIME DISTRIBUTION WITH RECURRENT EVENT DATA UNDER AN INFORMATIVE MONITORING PERIOD

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We consider a biomedical or public health study which monitors the occurrences of a recurrent event for n subjects or units. We assume that the i^{th} unit is monitored over a period [0, τ_i] and denote by $T_{i1}, T_{i2}, \ldots,$ the successive event interoccurrence times for this unit, with τ_i independent of the $T_{ij}'s$. Over the monitoring period, a total of $K_i = \max\{k : T_{i1} + T_{i2} + \ldots + T_{ik} \le \tau_i\}$ will be observed. In addition, we assume that the $T_{ij}'s$ are IID from an unknown parametric distribution function F(t) = F(t; θ) where θ is a p-dimensional parameter, and the $\tau_i's$ are IID from a distribution function G(t). We address the problem of estimating θ and consequently the gap-time distribution F(t), under the assumption that $\overline{G} = \overline{F}^{\beta}$ for some unknown $\beta > 0$, the so-called Koziol-Green model. We present finite and asymptotic properties of the estimators of θ, β and of F(t), and compare the estimator of F(t) with the nonparametric estimator in Pena, Strawderman and Hollander (2001, JASA) to ascertain the efficiency gain that is achieved by exploiting the Koziol-Green structure and the parametric assumption.