Statistical Analysis of Event Duration with Missing Origin

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Abstract: Understanding the distribution of an event duration time is essential in many studies. The exact time to the event is often unavailable, and thus so is the full event duration. By linking information on longitudinal measures to the event duration via first-hitting-time model, we propose an estimation procedure for duration distribution and conduct semi-parametric regression analysis of event duration with missing origin. We establish the consistency and weak convergence of the proposed estimator and present its variance estimation. A collection of wildfire records is used to motivate and illustrate the proposed approach. The finite-sample performance of the proposed estimator is examined via simulation. Viewing the available data as interval-censored times, we show that proposed nonparametric estimator is valid and more efficient than the well-established Turnbull estimator, an alternative for these situations.