

Nonparametric Estimation of a Distribution Function Under Biased Sampling and Multiplicative Censoring

Micha Mandel

The Hebrew University of Jerusalem, Israel

E-Mail: msmic@mscc.huji.ac.il

Abstract: Suppose that instead of observing realizations of $X \sim F$, one observes realizations of X^w from a weighted distribution $F^w(dx) \propto w(x)F(dx)$. Furthermore, observations may be multiplicative censored, that is, part of the data are realizations of UX^w , where U is an independent uniform $(0,1)$ random variable. Given these data, one aims at estimating the law F without any further parametric assumptions. The model with $w(x) = x$ was studied by Vardi (1989, *Biometrika*) and it naturally arises when sampling stationary renewal processes or when collecting cross-sectional data. However, in many cases data are more complex. Examples are when entrances to the population are governed by an inhomogeneous Poisson process or when lifetimes are composed of several phases. In such cases, data are subject to different biases and censoring mechanisms and require new models and estimation methods. Motivated by data on promotions in the Hebrew University, I present in this talk new multiplicative censoring models. I offer algorithms to estimate non-parametrically the distribution function of lifetimes, F , and discuss their properties.