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# Nonparametric $M$ -estimation for right censored regression model with stationary ergodic data

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## Abstract

The present paper deals with a nonparametric  $M$ -estimation for right censored regression model with stationary ergodic data. Defined as an implicit function, a kernel-type estimator of a family of robust regression is considered when the covariate take its values in  $\mathbb{R}^d$  ( $d \geq 1$ ) and the data are sampled from a *stationary ergodic process*. The strong consistency (with rate) and the asymptotic distribution of the estimator are established under mild assumptions. Moreover, a usable confidence interval is provided which does not depend on any unknown quantity. Our results hold without any mixing condition and do not require the existence of marginal densities. A comparison study based on simulated data is also provided.

**Keywords:** Asymptotic normality, censored data, confidence interval, ergodic data, Kaplan-Meier estimator, robust estimation, strong consistency, synthetic data.

**Subject Classifications:** 60F10, 62G07, 62F05, 62H15.

## 1 Introduction

Consider a pair  $(X, T)$  of random variables defined in  $\mathbb{R}^d \times \mathbb{R}$ ,  $d \geq 1$ , where  $T$  is a variable of interest and  $X = (X^1, \dots, X^d)$  a vector of concomitant variables. In many situations, one can be interested in the regression function  $m(x) = \mathbb{E}(T|X = x)$  for  $x \in \mathbb{R}^d$ , which allows to describe the relationship between  $T$  and  $X$ .

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