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## On Estimation of Conditional Distribution Function under Dependent Random Right Censored Data

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*In this article we study simple integral-type estimator of distribution function under random right censored observations at fixed covariate values, where the dependence between a life time and a censoring variable may expressed by a given Archimedean copula. We prove an almost sure asymptotic representation which provides a key tool for obtaining weak convergence result for estimator.*

*Keywords: fixed design, right censoring, copulas, asymptotic representation, weak convergence, Gaussian process.*

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## Introduction

In such research areas as bio-medicine, engineering, insurance, social sciences, . . . , researchers are interested in positive variables, which are expressed as a time until a certain event. For example, in medicine the survival time of individual, while in industrial trials, time until breakdown of a machine are non-negative random variables (r.v.-s) of interest. But in such practical situations, the observed data may be incomplete, that is censored. This is the case, for example, in medicine when the event of interest-death due to a given cause and the censoring event is death due to other cause. In industrial study, it may occur that some piece of equipment is taken away (that is censored) because it shows some sign of future failure. Moreover, the r.v.-s of interest (lifetimes, failure times) and censoring r.v.-s usually can be influenced by other variable, often called prognostic factor or covariate. In medicine, dose of a drug and in engineering some environmental conditions (temperature, pressure, . . . ) are influenced to the observed variables. The basic problem consist in estimation of distribution of lifetime by such censored dependent data. The aim of paper is considering this problem in the case of right random censoring model in the presence of covariable.

Let's consider the case when the support of covariate  $C$  is the interval  $[0, 1]$  and we describe our results on fixed design points  $0 \leq x_1 \leq x_2 \leq \dots \leq x_n \leq 1$  at which we consider responses (survival

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