



Non-parametric Estimation of Conditional Distribution Function

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Abstract

In this project, we consider the double kernel estimation of conditional distribution functions, which involves smoothing in both the x and y directions. For the smoothing in the y direction, we suggest the Gamma or Poisson kernel as the alternative to the usual normal kernel when y is positive. A simple method to choose the smoothing parameter for the Gamma and Poisson kernel is proposed. We also consider a new approach to estimate a conditional distribution through the estimation of Laplace transform and establish a connection between this approach and the double kernel estimator based on the Poisson kernel. The proposed methods are illustrated using two real data sets. By making use of the proposed method, we can effectively incorporate auxiliary information to improve the estimation of a finite population distribution function. The improvement over the naïve estimator and a model-based estimator is shown in a simulation study using a beef farm population.