

Asymptotics of Huber-Dutter Estimators for Partial Linear Model

Tong Xingwei¹, Cui HengJian¹ and ZhaoHui²

¹*Department of Mathematics, Beijing Normal University, Beijing, 100875, China*

²*School of Mathematical Sciences, Peking University, Beijing, 100871, China*

Abstract For partial linear model $Y = X^T\beta_0 + g_0(t) + \epsilon$ with unknown $\beta_0 \in R^d$ and an unknown smooth function g_0 , this paper considers the Huber-Dutter estimators of β_0 , scale σ for the errors and the function g_0 respectively, in which the smoothing B-spline function is used. Under some regular conditions, it is shown that the Huber-Dutter estimators of β_0 and σ are asymptotically normal with convergence rate $n^{-1/2}$ and the B-spline Huber-Dutter estimator of g_0 achieves the optimal convergence rate in nonparametric regression. A simulation study and two examples demonstrate that the Huber-Dutter estimator of β_0 is competitive with its M-estimator without scale parameter and the ordinary least square estimator.

Key Words and Phrases: Huber-Dutter estimator, Partial linear model, M-estimator, Optimal convergence rate, B-spline function.