Jump or Kink: Super-efficiency in Segmented Linear Regression
Break-point Estimation

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Abstract: We consider the problem of segmented linear regression with the focus on estimating of the location of the break-point(s). Let $n$ be the sample size, we show that the global minimax convergence rate for this problem in terms of the mean absolute error is $O(n^{-1/3})$. On the other hand, we demonstrate the construction of a super-efficient estimator that achieves the pointwise convergence rate of either $O(n^{-1})$ or $O(n^{-1/2})$ for every fixed parameter values, depending on whether the structural change is a jump or a kink. We discuss the implications of this example and the potential remedy. We also illustrate this phenomenon in the multivariate setting.