Testing for affinity of the regression function in boundary regression

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In this talk we consider a boundary regression model, i.e. the regression function $g : [0, 1] \to \mathbb{R}$ does not represent the expect value of the observations, but the endpoint of their support. A nonparametric estimator for g has been proposed in [1]. Here we would like to test, whether the regression function is affine. As test statistic we use the $\mathcal{L}^2$-distance T of the estimator $\hat{g}$ proposed in [1] to the space of affine functions.

Using a Lindeberg-Feller type central limit theorem for mixing sequences, we show that T is asymptotically normal distributed under the null hypotheses.

Moreover, we apply this test to demographic data [2]. We consider in each year the maximal life expectancy attained in any country of the world. This maximal life expectancy has an almost perfectly affine growth in time. Still our test will be able to detect non-affinity with high significance.

References

[1] P. Hall and I. v. Keilegom: Nonparametric "regression" when errors are positioned at end-points, *Bernoulli* **15** (2009), pp. 614–633.

[2] J. Oeppen and J. Vaupel: Broken limits to life expectancy, *Science* **296** (2002), pp. 1029–1031.