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**Application of Bernstein polynomials for smooth estimation of a distribution and density function. (English. English summary)**

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Summary: “The empirical distribution function is known to have optimum properties as an estimator of the underlying distribution function. However, it may not be appropriate for estimating continuous distributions because of its jump discontinuities. In this paper, we consider the application of Bernstein polynomials for approximating a bounded and continuous function and show that it can be naturally adapted for smooth estimation of a distribution function concentrated on the interval  $[0, 1]$  by a continuous approximation of the empirical distribution function. The smoothness of the approximating polynomial is further used in deriving a smooth estimator of the corresponding density. The asymptotic properties of the resulting estimators are investigated. Specifically, we obtain strong consistency and asymptotic normality under appropriate choice of the degree of the polynomial. The case of distributions with other compact and non-compact support can be dealt with through transformations. Thus, this paper gives a general method for non-parametric density estimation as an alternative to the current estimators. A small numerical investigation shows that the estimator proposed here may be preferable to the popular kernel-density estimator.”