2001c:62059  62G09  60F05  62E20
Babu, G. Jogesh (1-PAS-S); Pathak, P. K. (1-MIS-S);
Rao, C. R. [Rao, Calyampudi Radhakrishna] (1-PAS-S)
Second-order correctness of the Poisson bootstrap. (English. English summary)
Let $S = (X_1, \ldots, X_n)$ be a random sample of iid observations on the real line. The ordinary bootstrap scheme uses $\tilde{X}_1, \ldots, \tilde{X}_n$ drawn from $S$ with replacement. C. R. Rao, P. K. Pathak and V. I. Koltchinskii [J. Statist. Plann. Inference 64 (1997), no. 2, 257–281; MR 99j:62059] introduced a sequential resampling method, in which resampling is carried out one-by-one with replacement until $m + 1$ distinct original observations appear, where $m$ denotes the largest integer not exceeding $(1 - e^{-1})n$.

The authors modify in the present paper this resampling scheme by sampling according to $n$ independent Poisson distributed random variables $Y_1, \ldots, Y_n$, each having mean 1. If there are exactly $m$ nonzero values in this sample, it is accepted and the bootstrap sample is taken by repeating the observation $X_i Y_i$ times. By this Poisson approach, existing techniques of Edgeworth expansions can be employed for the proof that the error of the bootstrap estimate of $P\left( \frac{Y_1 + \cdots + Y_n}{n} - E(X) \right) \leq x\sigma$ is of order $O_P(n^{-1})$, uniformly for $x$.

[References]