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Abstracts of Short Communications and Posters

Section:

12. Probability and Statistics

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Hwang, Tea-Yuan, National Tsing-Hua University; Hu, Chin-Yuan, National Changhua University of Education, Taiwan, ROC
On some characterizations of popultaion distributions
Earlier works of the present authors and a method due to Anosov for solving certain intego-functional equations are combined to show that the independence of the sample mean $\bar{X}_n$ and the Z_n-statistic characterizes the normal population, when the random samples are iid from a population having a continuous density function on R, and the sample size $n \geq 3$; obiously, the sample standard devitation is an $Z_n$statistic. An important subclass of Z_n-statistic with the form of a linear combination $\sum_{i=1}^n a_i X_{(i)}$ of order statistics has been found, where $a_1 \leq \cdots \leq a_n$, not all equal and $\sum_{i=1}^n a_i = 0$; the sample range and Gini's mean difference are included in this subclass. Similar approaches can be applied to prove that the independence of $\bar{X}_n$ and $Z_n/\bar{X}_n$ characterizes the gamma distribution.
References: (1) D. V. Anosov, on an integral equation arising in statistics, Vestnik Leningrad Univ., 7(1964), 151-154, (2) T. Y. Hwang, and C. Y. Hu, On the joint distribution of studentized order statistics. Ann. Inst. Statist. Math., 46, (1994), 165-177.