A NOTE ON AN ALTERNATIVE FORMULA FOR CALCULATING THE S^2 AND ITS USES

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Abstract

To do this article has been referred to the article of Stigler. That gives the proof of the joint distribution between the sample mean and the sample variance with the assumption that the population is normally. The machine formula of S^2 has been used during the proof by Stigler, the bevariate distributed is been needed and the Induction Theory, also. Starting in this context and as part of statistical education it has been brought a different view point of doing the proofs of some important results and derivations of the sample mean distribution. It has been changed the scheme of proof replaying the machine formula with an alternative formula of S^2, which is a less used definition of the sample variance. Compared with Stigler this method of proof gives less calculation. It is of interest to know what the covariance of the sample mean and the sample variance is without the assumption of normality. One method of proof is been done by Zhang (2007). He did not use the well-known formula of the sample variance, but it has been used the alternative formula to give the same result in easer way. It, also, has been used the fact that the third moment of the sample population exists. The computations were straightforward and did not require advanced mathematical notions. Is been showed an example of Poisson distributed to illustrate the fact that the covariance of the joint distribution of the sample variance and the sample mean were zero, but they were not independent. It has been constructed a table of joint probability and from this has been displayed the result. Starting from this example and regarding challenges in teaching Statistics we pretend in future to apply the distribution of an average of Poisson random variables in advance Statistics.

Keywords: *sample variance, sample mean, independence, Poisson*