

Keio Workshop Dec 6-8. 2011

Skew Symmetry and Generalized Lehmann's Alternative Models

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Abstract

There are many research works on skew symmetric distribution and statistical inferences for the distributions, beginning with the paper by Azzalini(1985) [1] for uni-variate distributions.. They discuss parametric estimation problems based on Maximum Likelihood. We see their development over the case of multivariate skew distributions as well, more recently [2].

In my presentation, I will work on a uni-variate case where I will represent their skew symmetric distributions within the framework of my transformation model (it is also called a Generalized Lehmann's Alternative Model. [3]). Then, I will refer to my old work [4] where non-parametric rank-based estimators of location parameters and of skew parameters were defined and their asymptotic normality were proved. Applying this old result to the case of skew symmetric distribution we can see an asymptotic normality of these estimators.

It is very straight to obtain the asymptotic normality of the estimators for the case where the observations are assumed to be a sequence of independent and identically distributed random variables. Then, I would like to show that it is possible to apply the recent results to extend the above statement for the case where the observations are a sequence of weakly dependent random variables. The weak dependence brings some difference to the asymptotic variance of the non-parametric estimators.

References

- [1].Azzalini, A.(1985) .“A Class of Distributions which includes the Normal Ones.” Scandinavian Journal of Statistics. Vol.12. 171-178.
- [2].Azzalini, A.(2005). “ The skew normal distribution and related multivariate families.” Scandinavian Journal of Statistics. Vol.32. 159-188.
- [3].Lehmann, E.L.(1953) . “The power of rank tests.” Annals of Mathematical Statistics. Vol.24. 23-43.
- [4].Tsukahara, H. & Miura, R.(1993). “One sample estimation for generalized Lehmann's alternative models.” Statistica Sinica. Vol.3. 83-101.