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Abstract

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A general central limit theorem and subsampling variance estimator for α-mixing multivariate point processes.

Joint with Rasmus Plenge Waagepetersen

Central limit theorems for multivariate summary statistics of α-mixing spatial point processes have usually been established using either the so-called Bernstein's blocking technique or an approach based on [3]. It is characteristic that essentially the same theorems have been (re)-invented again and again for different specific settings and statistic considered. Moreover, although there exists estimates in some particular cases, the asymptotic variance is usually unknown or difficult to compute.

In this talk, we present a unified framework based on [3] to state, once and for all, a general central limit theorem for α-mixing multivariate point process that applies in a general non-stationary setting and is also applicable to non-parametric kernel estimators depending on a bandwidth converging to zero. In particular, we argue why this approach is more suitable that the one using Bernstein's blocking technique. We believe this can save a lot of work and tedious repetitions in future applications of α-mixing point processes.

Finally, we present a subsampling estimator of the asymptotic variance in central limit theorems. Our estimator is very flexible and model free. We illustrate its use in connection to confidence interval of estimators obtained by composite likelihood method for several non stationary point processes that may be regular or clustered.

Our results are available in [1] and [2].

References

[1] Christophe Ange Napoléon Biscio, Arnaud Poinas, and Rasmus Waagepetersen (2018). A note on gaps in proofs of central limit theorems. *Statistics and Probability Letters* **135**, 7–10.

[2] Christophe Ange Napoléon Biscio and Rasmus Waagepetersen (2019). A general central limit theorems and subsamlping variance estimate for α-mixing point processes. *Scandinavian Journal of Statistics*, (to appear).

[3] Erwin Bolthausen (1982). On the central limit theorem for stationary mixing random fields. *The Annals of Probability* 10 (4), 1047–1050.