RANDOMIZED LIMIT THEOREMS FOR STATIONARY PROCESSES

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Abstract

The report will review the latest results on limit theorems for randomized stationary processes. In his recent work [1], A. Tempelman proposed an interesting randomization procedure:

Let $X = \{X(t), t \in \mathbb{R}^m\}$, be a stationary random process, (T_n) be an increasing family of subsets of $\mathbb{R}^m$, $\{\tau_{n,i},\ n = 1, 2, ...; i = 1, ..., k_n,\}$ be independent random variables uniformly distributed on T_n which are also independent of X. Then a randomized process is understood as a triangular array

$$A_n = \{X(\tau_{n,i}), i = 1, ..., k_n\},\ \ n = 1, 2, ...$$

It turns out that with such a randomization under minimal conditions on the original process (often only ergodicity is sufficient!), the main limit theorems (CLT, invariance principle, convergence of empirical processes,...) are valid for A_n.

The latter circumstance explains the interest and significance of this approach for statistical applications.

References

[1] A. Tempelman, Randomized multivariate central limit theorems for ergodic homogeneous random fields, Stochastic Processes and their Applications, 143 (2022), 89-105.

[2] Yu. Davydov, A. Tempelman, Randomized multivariate central limit theorems for ergodic homogeneous random fields II. Reduction of the moment condition, (2022 January 22) https://arxiv.org/abs/2201.08981.