

Stein's method for randomized CLT

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On the one hand, Stein's method is a set of tools developed from the seminal paper [1] to control the distance to the normal distribution. In particular, it has proved very effective in the case of sums of independent random variables, and hence convergence rates in CLT.

On the other hand, random CLTs and the existence of typical distributions are well-studied phenomena since the work of Sudakov [2]. They consist in the fact that under certain assumptions about the random vector X , the weighted sum $\theta \cdot X$ concentrates towards the normal distribution, where the weight θ is drawn uniformly at random in the $(n-1)$ sphere.

In this talk, we'll see how Stein's method can be implemented in this context, and how it can recover some non-optimal rates. The question of whether Stein's method can recover the best results known from Fourier analysis remains open.

[1] STEIN, Charles. A bound for the error in the normal approximation to the distribution of a sum of dependent random variables. In : Proceedings of the Sixth Berkeley Symposium on Mathematical Statistics and Probability, Volume 2: Probability Theory. University of California Press, 1972. p. 583-603.

[2] SUDAKOV, Vladimir Nikolaevich. Typical distributions of linear functionals in finite-dimensional spaces of higher dimension. In : Doklady Akademii Nauk. Russian Academy of Sciences, 1978. p. 1402-1405.

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