General normal approximation with applications to random measures and Stein couplings

Louis H. Y. Chen

National University of Singapore

Abstract

Let W be a random variable with $\mathbb{E}W = 0$ and $\mathrm{Var}(W) = 1$. Assume that there exists a random function $\hat{K}(\cdot)$ such that

$$\mathbb{E}Wf(W) = \mathbb{E}\int_{-\infty}^{\infty} f'(W+t)\hat{K}(t)dt$$

for all absolutely continuous functions $f : \mathbb{R} \to \mathbb{R}$ satisfying $f(w) \leq C(1 + |w|)$, where the constant C depends on f. We obtain a general bound on the Kolmogorov distance $d_{\mathrm{K}}(\mathscr{L}(W), \mathcal{N}(0,1))$ and apply it to random measures and Stein couplings. We obtain explicit bounds in a number of special cases. This talk is based in part on joint work with Aihua Xia.