Stein's method and the assessment of the quality of some distributional approximations in Statistics

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Stein's method is a powerful probabilistic technique that provides a collection of tools permitting to quantify the dissimilarity between probability distributions. After a brief, basic introduction to the method as first introduced by Charles Stein in the early 1970s, in this talk we will explain how one can employ Stein's method in order to obtain explicit upper bounds on the distributional distance between the true distribution of a statistic of interest and its limiting distribution. More specifically, we will focus on quantifying the asymptotic normality of the maximum likelihood estimator and of the empirical cross-covariance and autocovariance functions, as well as the quality of the chi-square approximation for the log-likelihood ratio statistic.