An Inversion Theorem Based Kernel Density Estimator for a Weighted Average and Difference of Weighted Averages with Applications

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In this talk we illustrate a new and novel kernel density estimator for a sum of weighted averages from a single population based on utilizing a classically defined kernel density estimator in conjunction with classical inversion theory. This idea is further developed for a kernel density estimator for the difference of weighted averages from two independent populations. There sulting estimator is “bootstraplike” in terms of its properties with respect to the derivation of approximate confidence intervals via a “plug-in” approach. This new approach is distinct from the bootstrap methodology in that it is analytically and computationally feasible to provide an exact estimate of the distribution function through direct calculation. Thus our approach eliminates the error due to Monte Carlo resampling that is arises within the context of simulation based approaches that are oftentimes necessary in order to derive bootstrap-based confidence intervals for statistics involving weighted averages of i.i.d. random variables. We then illustrate the newly developed extensions to this technique to a class of *L*-estimators.