

## The Linear Combination of Kernels in the Estimation of the Cumulative Distribution Functions

**Authors :** Abdel-Razzaq Mugdadi, Ruqayyah Sani

**Abstract :** The Kernel Distribution Function Estimator (KDFE) method is the most popular method for nonparametric estimation of the cumulative distribution function. The kernel and the bandwidth are the most important components of this estimator. In this investigation, we replace the kernel in the KDFE with a linear combination of kernels to obtain a new estimator based on the linear combination of kernels, the mean integrated squared error (MISE), asymptotic mean integrated squared error (AMISE) and the asymptotically optimal bandwidth for the new estimator are derived. We propose a new data-based method to select the bandwidth for the new estimator. The new technique is based on the Plug-in technique in density estimation. We evaluate the new estimator and the new technique using simulations and real-life data.

**Keywords :** estimation, bandwidth, mean square error, cumulative distribution function

**Conference Title :** ICMSS 2015 : International Conference on Mathematical Sciences and Statistics

**Conference Location :** Venice, Italy

**Conference Dates :** April 13-14, 2015