

A NEW TECHNIQUE TO NONPARAMETRIC METHOD OF SPECTRAL ANALYSIS

K. SURESH REDDY, S. VENKATA CHALAM AND B. C. JINAGA

Abstract

The Power spectrum estimation of randomly spaced samples using nonparametric methods is well known and is revisited in this paper. Commonly used nonparametric methods are Periodogram, Modified Periodogram and Welch methods. The Periodogram and Modified Periodogram are asymptotically inconsistent spectral estimators for non uniform samples, Welch method is a consistent estimate for the random samples and the method is revisited for getting low normalised variances using different percentage of circular overlapping of the samples than the existing Bartlett's method of estimation. Although Circular overlap causes a discontinuity on the random process; it is shown that for a normally distributed ergodic weakly stationary random process the power spectrum estimate is asymptotically unbiased. The variance of the proposed estimate decreases due to circular overlapping of the samples. Further an expression is derived for the lowest reachable variance with respect to different fractions of overlap of samples.

Keywords: Power Spectrum Estimation, Random sampled data, Welch Method, Circular Overlapping, Modified Welch, Low Variance, Consistent estimate.