

Estimating the intensity of a cyclic Poisson process in the presence of linear trend

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Abstract We construct and investigate a consistent kernel-type nonparametric estimator of the intensity function of a cyclic Poisson process in the presence of linear trend. It is assumed that only a single realization of the Poisson process is observed in a bounded window. We prove that the proposed estimator is consistent when the size of the window indefinitely expands. The asymptotic bias, variance, and the mean-squared error of the proposed estimator are also computed. A simulation study shows that the first order asymptotic approximations to the bias and variance of the estimator are not accurate enough. Second order terms for bias and variance were derived in order to be able to predict the numerical results in the simulation. Bias reduction of our estimator is also proposed.

Keywords Cyclic Poisson process · Intensity function · Linear trend · Nonparametric estimation · Consistency · Bias · Variance · Mean-squared error