On Regularity Conditions and Properties of Estimators for Poisson Processes

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We consider the problem of parameter estimation by observations of inhomogeneous Poisson process. It is well-known that if the regularity conditions are fulfilled then the maximum likelihood and bayesian estimators are consistent, asymptotically normal and asymptotically efficient. These regularity conditions can be roughly presented as follows: a) the intensity function of observed process belongs to known parametric family of functions, b) the model is identifiable, c) the Fisher information is positive continuous function, d) the intensity function is sufficiently smooth with respect to the unknown parameter, e) this parameter is an interior point of the interval. We are interested in the properties of estimators when these regularity conditions are not fulfilled. More precisely, we reject these conditions one by one and we show how the properties of the MLE and Bayesian estimators change.