

STEP-WISE SAMPLING SCHEME FOR A POISSON INTENSITY PARAMETER

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SUMMARY

In this paper, we consider estimation of Poisson intensity parameters when independent samples are taken under a step-wise sampling scheme. In the first step, a sample X_{11} is taken which has a Poisson distribution with a parameter $(\lambda_1 + \lambda_2 + \lambda_3)$. In the second step, due to advancement of technology, one can observe X_{21} and X_{22} , which follow Poisson distributions with parameters λ_1 and $(\lambda_2 + \lambda_3)$, respectively. In the third step, it is possible to take three samples, due to more advanced techniques, X_{31} , X_{32} and X_{33} , which has Poisson distribution with parameters, λ_1 , λ_2 and λ_3 , respectively. In each step, the samples are assumed independent. This method of sampling is called a step-wise sampling scheme. In this paper, we present a method of estimating the parameters, λ_1 , λ_2 and λ_3 , and study the performance of the estimators. Using the samples taken in three stages together, we obtain the maximum likelihood estimators and Bayes estimators. Using the covariance matrices, we study the effect of combining the samples taken in three steps. In this paper, we consider three-stage samples for simplicity because the method can be easily extended to more than three-stage samples.

Keywords and phrases: Bayes estimate, Poisson intensity parameter, step-wise sampling scheme.

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