Integrated Likelihood Inference in Poisson Distributions

Timothy Ruel
Department of Statistics and Data Science, Northwestern University

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Abstract

The text of your abstract. 200 or fewer words.

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1 Introduction

Suppose we are interested in estimating the weighted sum of a group of Poisson means corresponding to n independent populations, where n is a known positive integer. Let X_i denote the Poisson random variable modeling the ith population with associated parameter $\mathrm{E}(X_i) = \mathrm{V}(X_i) = \theta_i$, $i = 1, ..., n$. Note that the maximum likelihood estimate (MLE) for θ_i is simply $\hat{\theta}_i = x_i$, the observed value of X_i. Consider the weighted sum

$$Y = \sum_{i=1}^{n} w_i X_i,$$

where each w_i is a known constant greater than zero. The purpose of this paper is to consider likelihood- and pseudolikelihood-based inference for the real-valued parameter of interest

$$\psi \equiv \mathrm{E}(Y) = \sum_{i=1}^{n} w_i \theta_i.$$

In particular, we will analyze the performance of point and inverval estimates for ψ based on the integrated likelihood function and a proposed modification to it. Similar estimates obtained from the profile likelihood will be used as a benchmark.

References