

Distribution Theory Preliminary Quiz

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Poisson

Consider X_1, X_2, \dots, X_n that are independent and identically distributed from a Poisson distribution,

$$f(x|\lambda) = \frac{e^{-\lambda}\lambda^x}{x!}, \quad \lambda > 0, x = 0, 1, 2, \dots$$

- a) Show that \bar{x} is the maximum likelihood estimator of λ
- b) Use R to randomly generate $n = 20$ observations from a Poisson distribution with $\lambda = 10$ and store this data as `quiz.data1`.
- c) Write an R function to calculate the log-likelihood of the Poisson distribution for a dataset, and calculate the log-likelihood for $\lambda = 8, 9, 10, 11$, and 12 for your dataset.