

Notes on Statistics

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1 Distributions from random samples

1.1 Random samples and statistics

The random variables X_1, \dots, X_n are called a random sample of size n from the population $f(x)$ if they are independent and identically distributed with pdf or pmf $f(x)$, or iid random variables. Let $T(x_1, \dots, x_n)$ be a real-valued or vector-valued function whose domain includes of sample space of (X_1, \dots, X_n) , then the random variable or random vector $Y = T(X_1, \dots, X_n)$ is called a statistic, whose distribution is called the sampling distribution of Y .

2 Point estimation

3 Hypothesis testing

4 Interval estimation

5 A complete example

6 More examples

7 Analysis of variance

8 Linear regression

A Distribution of transformations of random variables

$$f_{\mathbf{U}}(u_1, \dots, u_n) = \sum_i f_{\mathbf{X}}(h_{1i}(u_1, \dots, u_n), \dots, h_{ni}(u_1, \dots, u_n)) |J_i|, \quad (1)$$

B Two useful relations

References