Statistical Methods in Particle Physics

Quiz on chapter 6: Hypothesis Testing

Prof. Dr. Klaus Reygers (lectures)
Dr. Sebastian Neubert (tutorials)

Heidelberg University
WS 2017/18

Please connect to

http://pingo.upb.de/276848

A simple hypothesis

1. can be formulated analytically
2. has no free parameters
3. is rejected with a probability larger than 68%
4. can be tested with relatively small data samples

A simple hypothesis

1. can be formulated analytically
2. has no free parameters
3. is rejected with a probability larger than 68%
4. can be tested with relatively small data samples

A variable that is a function of the data alone and that can be used to test a hypothesis is called

1. run test
2. test statistic
3. Kolmogorov-Smirnov variable
4. Neyman-Pearson variable

A variable that is a function of the data alone and that can be used to test a hypothesis is called

1. run test
2. test statistic
3. Kolmogorov-Smirnov variable
4. Neyman-Pearson variable

The p-value is the probability

1. that an alternative hypothesis H1 is false
2. of a model being true
3. to observe an equal or larger deviation of the data from a model given the model is true
4. to reject a true hypothesis

The p-value is the probability

1. that an alternative hypothesis H1 is false
2. of a model being true
3. to observe an equal or larger deviation of the data from a model given the model is true
4. to reject a true hypothesis

A difference between the significance level α of a test and the p-value is that

1. the p-value is a random variable while α is not
2. α can be greater than 1 while the p-value cannot
3. α can be always calculated analytically
4. is that the p-value is always greater than 0.9

A difference between the significance level α of a test and the p-value is that

1. the p-value is a random variable while α is not
2. α can be greater than 1 while the p-value cannot
3. α can be always calculated analytically
4. is that the p-value is always greater than 0.9

Suppose a "background only" hypothesis H0 is true and is rejected for a p-value < 0.005. What is the average number of false positive results if 10000 experiments are performed?

1. 0
2. 5
3. 10
4. 50

Suppose a "background only" hypothesis H0 is true and is rejected for a p-value < 0.005. What is the average number of false positive results if 10000 experiments are performed?

1. 0
2. 5
3. 10
4. 50

Testing the goodness of a fit by calculating the maximum deviation of the cumulative distribution function and the corresponding empirical distribution function is known as

1. Neyman-Pearson test
2. Kolmogorov–Smirnov test
3. Wald–Wolfowitz test
4. Gauss-Laplace test

Testing the goodness of a fit by calculating the maximum deviation of the cumulative distribution function and the corresponding empirical distribution function is known as

1. Neyman-Pearson test
2. Kolmogorov–Smirnov test
3. Wald–Wolfowitz test
4. Gauss-Laplace test

Testing a large number of hypotheses about a single data set to find a "significant" effect is sometimes called

1. hypothesis boosting
2. data manipulation
3. p-value hacking
4. type II error

Testing a large number of hypotheses about a single data set to find a "significant" effect is sometimes called

1. hypothesis boosting
2. data manipulation
3. p-value hacking
4. type II error

Let $f(t|H_0)$ be the distribution of a test statistic under hypothesis H_0 and t_{obs} the observed value. The quantity

$$\int_{t_{\mathrm{obs}}}^{\infty} f(t|H_0)\, \mathrm{d}t$$

is called

1. critical region
2. significance level
3. power of the test
4. p-value

Let $f(t|H_0)$ be the distribution of a test statistic under hypothesis H_0 and t_{obs} the observed value. The quantity

$$\int_{t_{\mathrm{obs}}}^{\infty} f(t|H_0)\,\mathrm{d}t$$

is called

1. critical region
2. significance level
3. power of the test
4. p-value

A run test

1. can be used to calculate the chi-squared
2. provides the same information as the chi-squared test
3. tests the hypothesis that the elements of a sequence are mutually independent
4. can be used to calculate the p-value

A run test

1. can be used to calculate the chi-squared
2. provides the same information as the chi-squared test
3. tests the hypothesis that the elements of a sequence are mutually independent
4. can be used to calculate the p-value

The aim of the Bayes factor is to

1. normalize the posterior distribution
2. quantify the support for a model over another
3. construct a credible interval
4. quantify the prior knowledge

The aim of the Bayes factor is to

1. normalize the posterior distribution
2. quantify the support for a model over another
3. construct a credible interval
4. quantify the prior knowledge