

Lecture 13: Chi Squared

课程 □ Unit 4 Hypothesis testing □ Distribution, T-Test

4. Parametric Hypothesis Testing -

Clinical Trials

4. Parametric Hypothesis Testing - Clinical Trials **Clinical Trials**

Clinical trials

Let us go through an example to remind the main notions of hypothesis testing.

- Pharmaceutical comp^r new drug is efficient.
- thesis testing to test if a
- To do so, they admir group) and a placebo
- a group of patients (test up (control group).
- We consider testing a drug that is supposed to lower LDL (low-density lipoprotein), a.k.a "bad cholesterol" among nationts with a high lovel of IDI (above 200 mg/dl)

(Caption will be displayed when you start playing the video.)

Start of transcript. Skip to the end.

So let's start with parametric hypothesis testing, which is essentially the one that we've seen before.

And just to remind ourselves how we just go through the maneuver of building a test, let's start with a very concrete example which

is clinical trials.

All right.

视频 下载视频文件 字幕

下载 SubRip (.srt) file 下载 Text (.txt) file

Note: The following are problems we will use to prepare for the upcoming video.

Clinical Trials: Hypothesis Test

0/1 point (graded)

We consider the clinical trials set-up of the above video. Let X_1,\ldots,X_n be i.i.d. test group samples distributed according to $\mathcal{N}\left(\Delta_d,\sigma_d^2
ight)$ and let Y_1,\ldots,Y_m be i.i.d. control group samples distributed according to $\mathcal{N}\left(\Delta_c,\sigma_c^2
ight)$. Assume that $X_1, \ldots, X_n, Y_1, \ldots, Y_m$ are independent.

Select from the following all valid hypothesis test formulations to know if the drug has an effect on cholesterol levels (that is, we wish to know whether the drug has a statistically significant effect on the decrease in cholesterol levels when compared to the decrease in the cholesterol levels due to the placebo).

 $lacksquare H_0: \Delta_d = \Delta_c, \ H_1: \Delta_d > \Delta_c \ \Box$

Solution:

Both are valid formulations for this specific question that will lead to the same test.

提交

你已经尝试了1次(总共可以尝试1次)

□ Answers are displayed within the problem

Clinical Trials: Consequence of Gaussian Samples

0/1 point (graded)

We consider the same set-up as the above problem. Let X_1,\ldots,X_n be i.i.d. test group samples distributed according to $\mathcal{N}\left(\Delta_d,\sigma_d^2\right)$ and let Y_1,\ldots,Y_m be i.i.d. control group samples distributed according to $\mathcal{N}\left(\Delta_c,\sigma_c^2\right)$. Assume that $X_1,\ldots,X_n,Y_1,\ldots,Y_m$ are independent.

Select from the following all statements that are correct or true.

$$\overline{X}_n = rac{X_1 + X_2 + \cdots + X_n}{n}$$
 is a gaussian random variable \square

$$\overline{Y}_m = rac{Y_1 + Y_2 + \cdots + Y_m}{m}$$
 is a gaussian random variable \Box

$$\overline{X}_n-\overline{Y}_m=rac{X_1+X_2+\cdots+X_n}{n}-rac{Y_1+Y_2+\cdots+Y_m}{m}$$
 is a gaussian random variable \Box

$$lacksquare X_i + Y_j$$
 is a gaussian random variable for any $i=1,\ldots,n$ and $j=1,\ldots,m$. \Box

The variance of
$$\overline{X}_n - \overline{Y}_m$$
 is $rac{\sigma_d^2 + \sigma_c^2}{n+m}$

Solution:

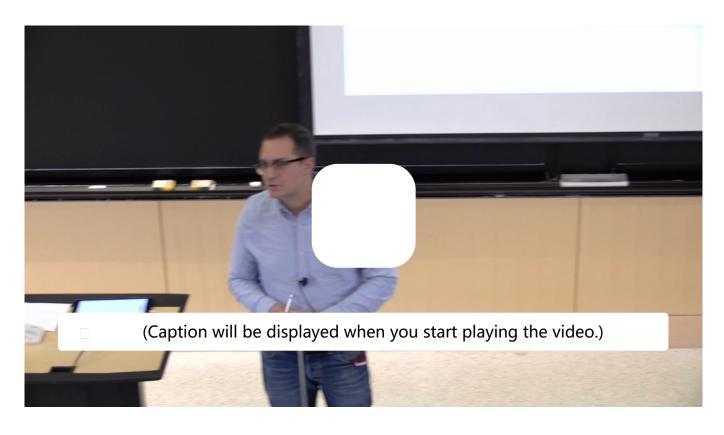
The first four choices are true because of a basic principle of gaussian random variables. The linear combination of any two gaussian random variables (independent or not) is a gaussian random variable.

The last choice is not correct because the variance of $\overline{X}_n - \overline{Y}_m$ is $\frac{\sigma_d^2}{n} + \frac{\sigma_c^2}{m}$.

提交 你已经尝试了2次 (总共可以尝试2次)

Answers are displayed within the problem

Clinical Trials - Setting up the Hypothesis Test



Start of transcript. Skip to the end.

I have a framework.

I have a mathematical language.

I'm no longer a pharmaceutical company.

I'm on the fourth floor.

I've talked to statisticians.

So now I want to--

Now they have some Greek letters, and they can actually formulate everything into mathematical language.