1. Comparisons of two proportions

Recitation problem statement

You are interested in comparing the proportions of people in their 20's that smoke in France and in the US. After you sample randomly and independently n people in their 20's in both countries, you observe that N_{US} sampled US Americans and N_F sampled French are smokers. Based on such an experiment, how would you test whether there is a significant difference between the proportions of smokers in both countries ?

Note: In the following videos, we introduce a new term called "pivot". The formal definition of a pivotal quantity (or a pivot) is as follows. Let $X_1, \ldots, X_n$ be random samples and let T_n be a function of X and a parameter vector θ. That is, T_n is a function of $X_1, \ldots, X_n, \theta$. Let $g(T_n)$ be a random variable whose distribution is the same for all θ. Then, g is called a pivotal quantity or a pivot.

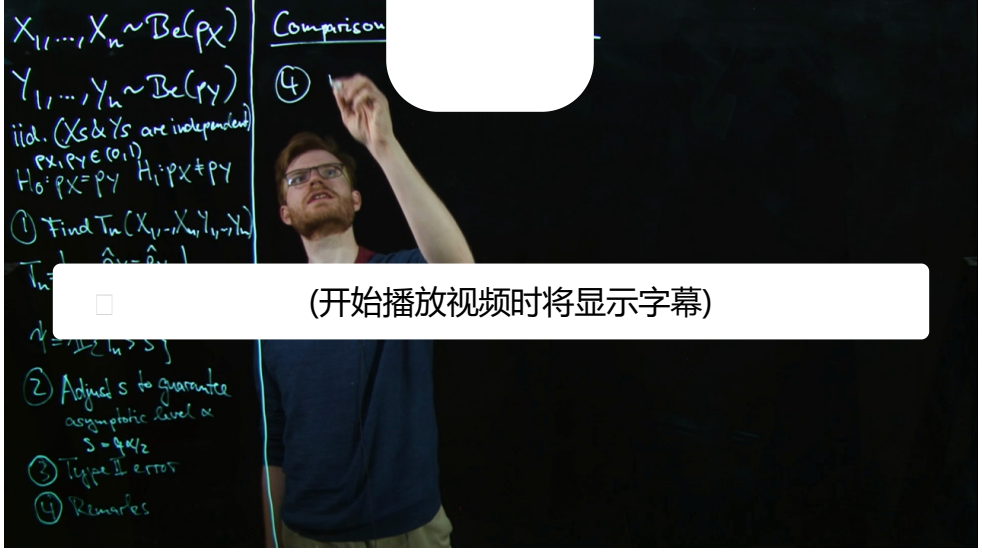
For example, let X be a random variable with mean μ and variance σ^2. Let $X_1, \ldots, X_n$ be iid samples of X. Then,

$$g_n \triangleq \frac{\overline{X_n} - \mu}{\sigma}$$

is a pivot with $\theta = \begin{bmatrix} \mu & \sigma^2 \end{bmatrix}^T$ being the parameter vector. The notion of a parameter vector here is not to be confused with the set of paramaters that we use to define a statistical model.

Setup and Asymptotic Variance

字幕开始。跳转至结尾。



or rather with the generalization

of what we just did.

And let's call this, what happens if we

have different sample sizes?

视频

下载视频文件

字幕

下载 SubRip (.srt) file

下载 Text (.txt) file

讨论

隐藏讨论

主题： Unit 4 Hypothesis testing:Recitation 7: Review: Comparisons of two Proportions / 1. Comparisons of two proportions

添加帖子

所有讨论帖

What is pivot?

由 SergK (社区助教) 于15天 以前发布此问题

I believe this is not the first time I hear the word *pivot* in recitations but still can't grok what it means. Can anybody enlighten me?

此帖对所有人可见。

markweitzman (社区助教)

15天 以前 - 14天 以前 前被 **sudarsanvsr_mit** (员工) 标记为答案

It means moving the parameters from one side of the equation to the other so, that the limiting distribution is independent of the parameter. So if $T \sim N(0, \sigma^2)$, we "pivot" the σ, so that $\frac{T}{\sigma} \sim N(0,1)$.

Thank you, Mark

GuilhermeKinzel 在8天 以前前发表

添加评论

添加回复

1个其他回复

sudarsanvsr_mit (员工)
14天 以前

We never introduced the term "pivot". So we will make a note to this recitation.

Always good to make a note but it was introduced in one of the first recitation.

bss04 在11天 以前前发表

Note it's also used in the exercises at the end of lecture 14...page 12 on the likelihood ratio test. There, it's used a bit differently.

First, it's used more in the sense of "pivotal quantity", which is what's left *after* the parameters have been pivoted away by the pivot function. That's also how it appears in the relevant Wikipedia article (https://en.wikipedia.org/wiki/Pivotal_quantity).

Second, (and this is a quibble): In the exercise, the term "pivotal distribution" is also used, which seems like a bit of extrapolation of the meaning, to something like, "a distribution that results from stripping out the parameters". Because if that distribution itself has any parameters (like degrees of freedom in a χ^2) then one could just stuff one of the original problem's parameters in there, and invalidate the distribution's claim to be "pivotal". One might define "pivotal distribution" to be one that has no un-pinned parameters, and where the values of the parameters are structural (like setting the number of degrees of freedom to the dimensionality of the parameter vector), not related to values of the original problem parameters.

ptressel 在7天 以前前发表

Very handwavingly, I read "pivotal distribution" as "something it is useful to make a reference table of" and "pivot" as "something you could look up in such a table".

dfannius (社区助教) 在7天 以前前发表

添加评论

显示所有的回复