Slides 17 Notes

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1 References and License

In this document we are recording notes on reading material in [1].
Please see the references section for detailed citation information.

2 Significance Level

Significance level is area under the curve in the rejection region. So if a test has a high significance level, it means it has a large rejection region. In turn, it means, it would be easy to fail the test - it's easy to reject the null hypothesis in favor of the alternative because the rejection region is so big.

3 Board Question on Significance Testing

There is a board question on null hypothesis significance testing in [1]. This is our attempt to solve it. We are given a null hypothesis H_0 that some data follows a normal distribution $N\left(5, 10^2\right)$.
Orloff and Bloom also give us an alternative hypothesis that the data follows a normal distribution $N\left(\mu, 10^2\right)$ where $\mu \neq 5$.
They give a test statistic z which is equal to the standardized mean of the data $\bar{x}$.
Finally they give a significance level of $\alpha = 0.05$. We pause to remember that the significance level is the area under the probability density function where the x axis is in the rejection region.

Orloff and Bloom give us that the test statistic z is the standardized sample mean $\bar{x}$. Therefore, given the null hypothesis H_0 above

$$z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{64}}}. \tag{1}$$

We us the values Orloff and Bloom give for the symbols in the equation above to calculate the value

$$z = \frac{6.25 - 5}{\frac{10}{8}}, \tag{2}$$

The equation above simplifies to

$$z = \frac{\frac{5}{4}}{\frac{5}{4}}, \tag{3}$$

References

[1] Jeremy Orloff and Jonathan Bloom. *Frequentist Statistics and Hypothesis testing 18.05 Spring 2014*. Available at `https://ocw.mit.edu/courses/mathematics/18-05-introduction-to-probability-and-statistics-spring-2014/class-slides/MIT18_05S14_class17_slides.pdf` (Spring 2014).