

Data Analysis and Statistical Methods

Statistics 651

<http://www.stat.tamu.edu/~suhasini/teaching.html>

Lecture 18 (MWF) More power practice and selecting sample size according to po

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Review of testing: Example

The administrator of a nursing home wants to do a time and motion study of staff time spent per day performing non-emergency work. Prior to the introduction of some efficiency measures the mean person hours per day spent on these tasks was 8. The administrator wants to test whether these measures have reduced average time. She collects a random sample of 30 staff and monitors their time. She finds the average person hours (based on this sample $n = 30$) spent is 7, test the hypothesis the mean time spent on performing non-emergency work has decreased after the introduction of efficiency measures. Assume the standard deviation $\sigma = 4$ and do the test at $\alpha = 10\%$ level. Construct a 95% CI for the daily mean time spent performing non-emergency tasks.

Solution: Do it.

Review of previous lecture: calculating power

- Two-sided tests: $H_0 : \mu = \mu_0$ against $H_A : \mu \neq \mu_0$, we do the test at the α level (usually this is $\alpha = 5\%$), and we are interested in the alternative μ_1 , then

$$\beta \approx P \left(Z \leq |z_{\alpha/2}| - \frac{|\mu_0 - \mu_1|}{\sqrt{\frac{\sigma^2}{n}}} \right).$$

and the power is $1 - \beta$. In the case that $\alpha = 5\%$, then $z_{\alpha/2} = 1.96$.

- One-sided tests: $H_0 : \mu \leq \mu_0$ or $H_A : \mu > \mu_0$ we do the test at the α