

Physics 341 - Lecture 16

- midterm 1 comments
- two-sample tests



→ class average 76%
(B, B+) //

→ $\sigma = 12.5\%$

$\mu + \sigma = \underline{\underline{88.5\%}}$

$\mu = 70\%$
 $\sigma = 16\%$ } perfect test
=

$\mu + \sigma = 86\%$

→ end of course !

→ final exam →

Is there really a difference
between B^+ and B ?

A, B, C, D, F

Fail

Correlation between MT vs HW

$$MT = \beta_0 + \beta_1 HW$$



↳ orange line

Summary

means testing

(\bar{x} vs. μ)

z, t

↑

know
 σ

↑

don't
know
 σ

χ^2 -test S vs. σ

how do we compare one
data set to another?

industrial process optimization

BEFORE vs. AFTER

$$\begin{pmatrix} \bar{x}_1 \\ s_1 \end{pmatrix} \text{ vs. } \begin{pmatrix} \bar{x}_2 \\ s_2 \end{pmatrix}$$

$$\boxed{\bar{x}_1 \text{ vs. } \bar{x}_2}$$

"

The system is being
upgraded and will soon
become unusable "

Two Group Comparison.

Example 1

Paired Data

	Test 1	Final	Δ	
1	78	83	+ 5	
2	55	72	+ 17	
3	81	67	- 14	
4	.	.	.	
5	.	.	.	
6	.	.	.	
7	.	.	.	
8	.	.	.	

\bar{x}_1

\bar{x}_2

s_1

s_2

8 data
pts.

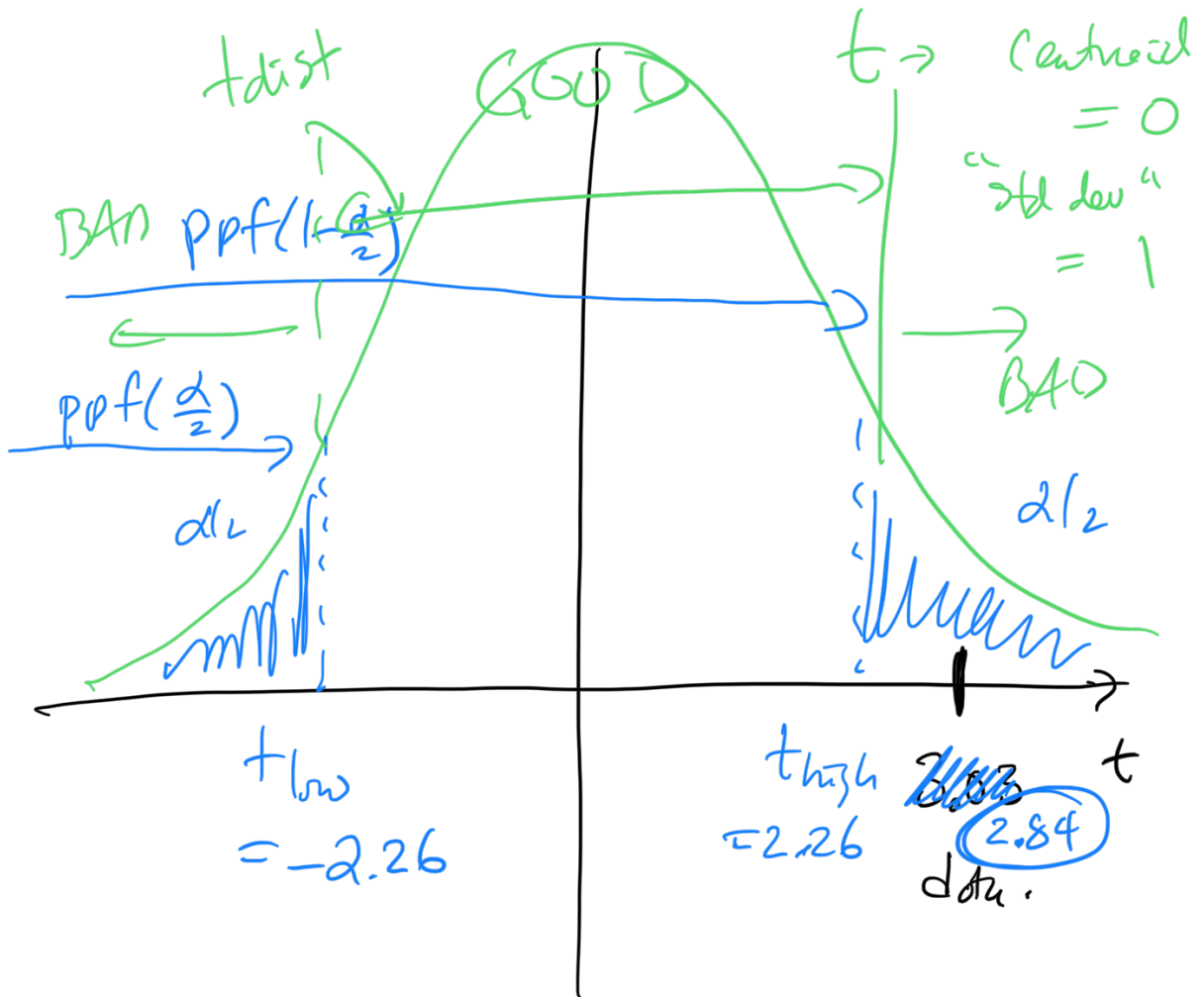
8 data
pts.

χ_D

$$S_{em} = \frac{S_D}{\sqrt{N}}$$

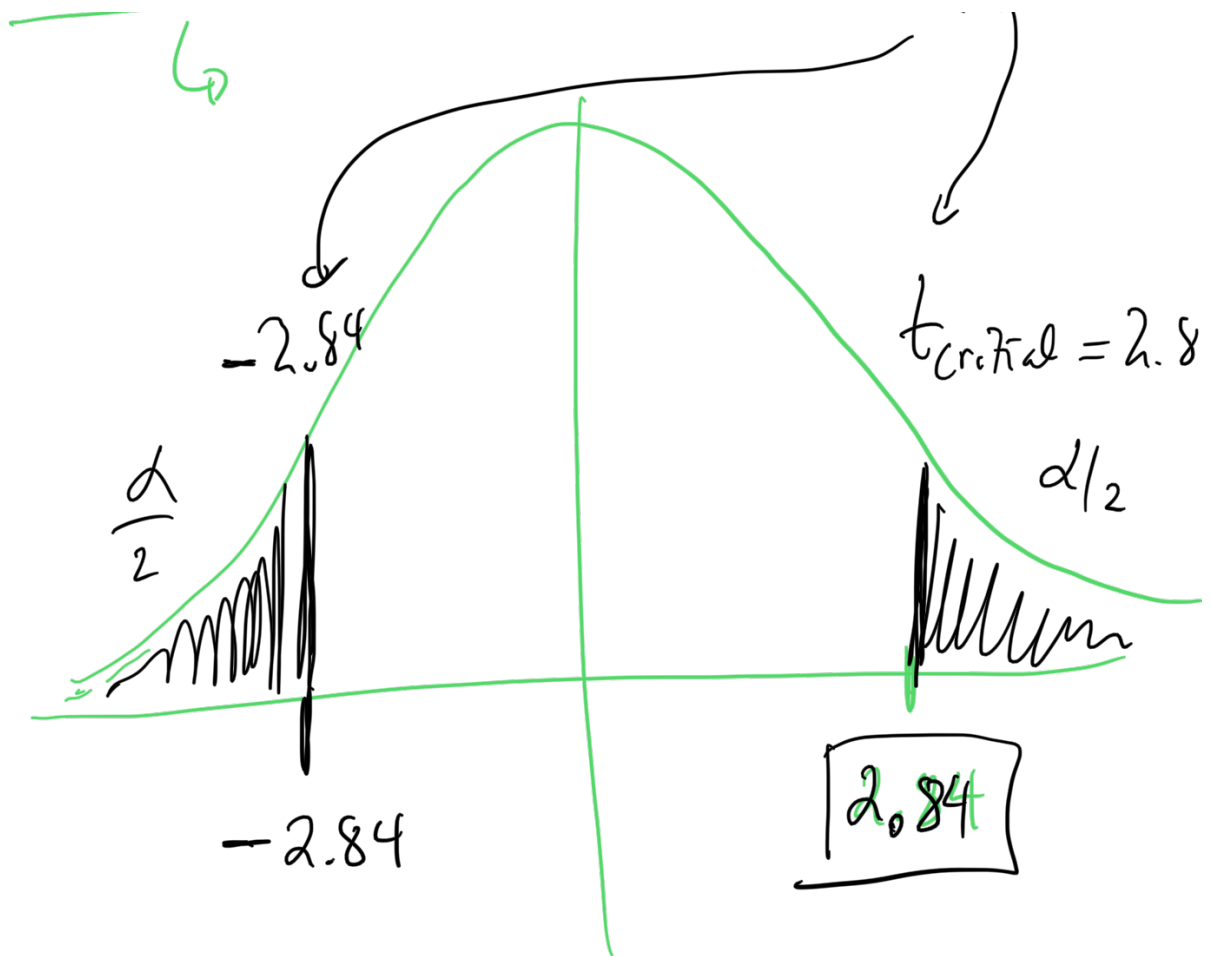
?

$$t_{diff} = \frac{\bar{x}_D - \mu}{SEM}$$



P-values

Some values of α



$$2 \times \text{tail}(-2.84) = \frac{\alpha}{2} \times 2 = \alpha$$

$$P = 0.019$$

98.1% sure

If $\alpha > P$ (.05)

REJECT

If $\alpha < P$

(.01)

FAIL TO REJECT

Small P values \rightarrow (REJECT
EFFECT
DIFFERENT
PROBLEM)