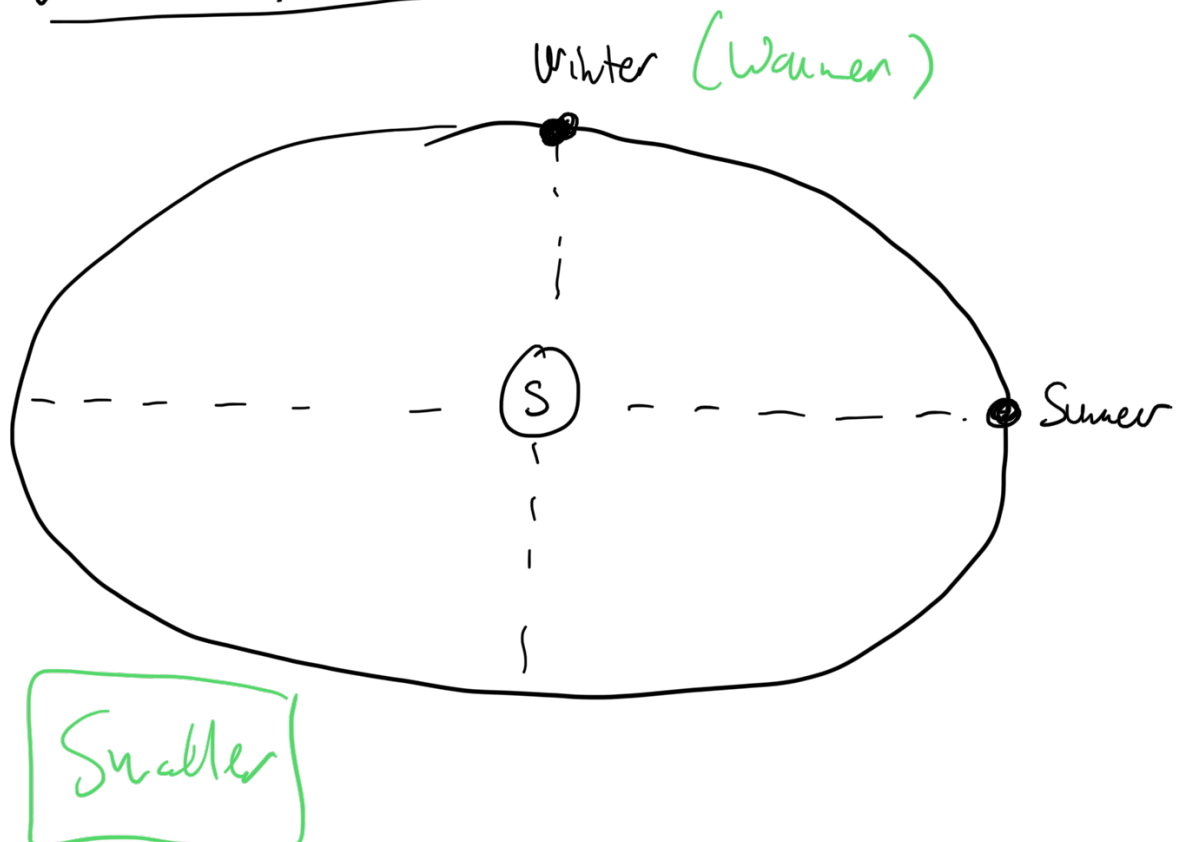


Physics 341 - Lecture 9

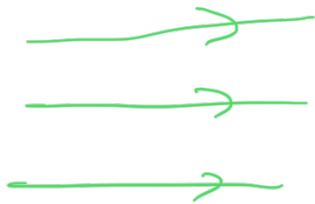
Earth → spherical

Two effects

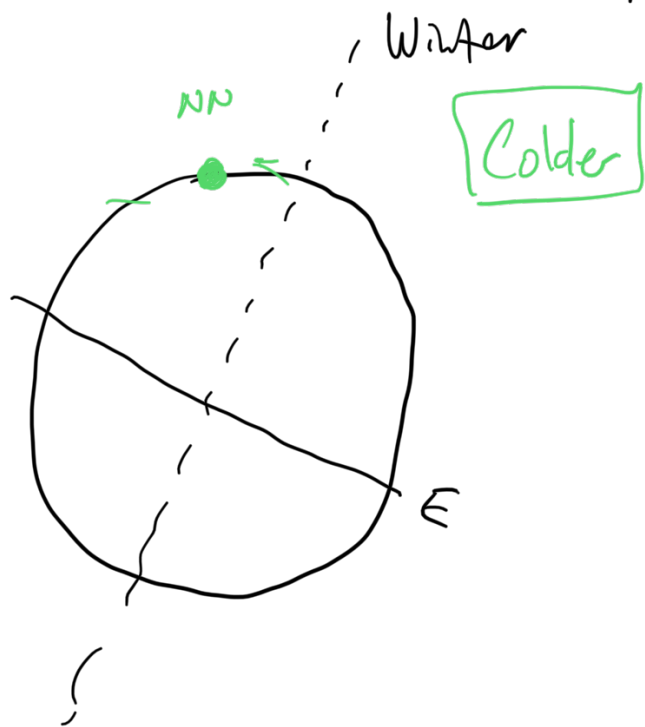


(S)

(E)

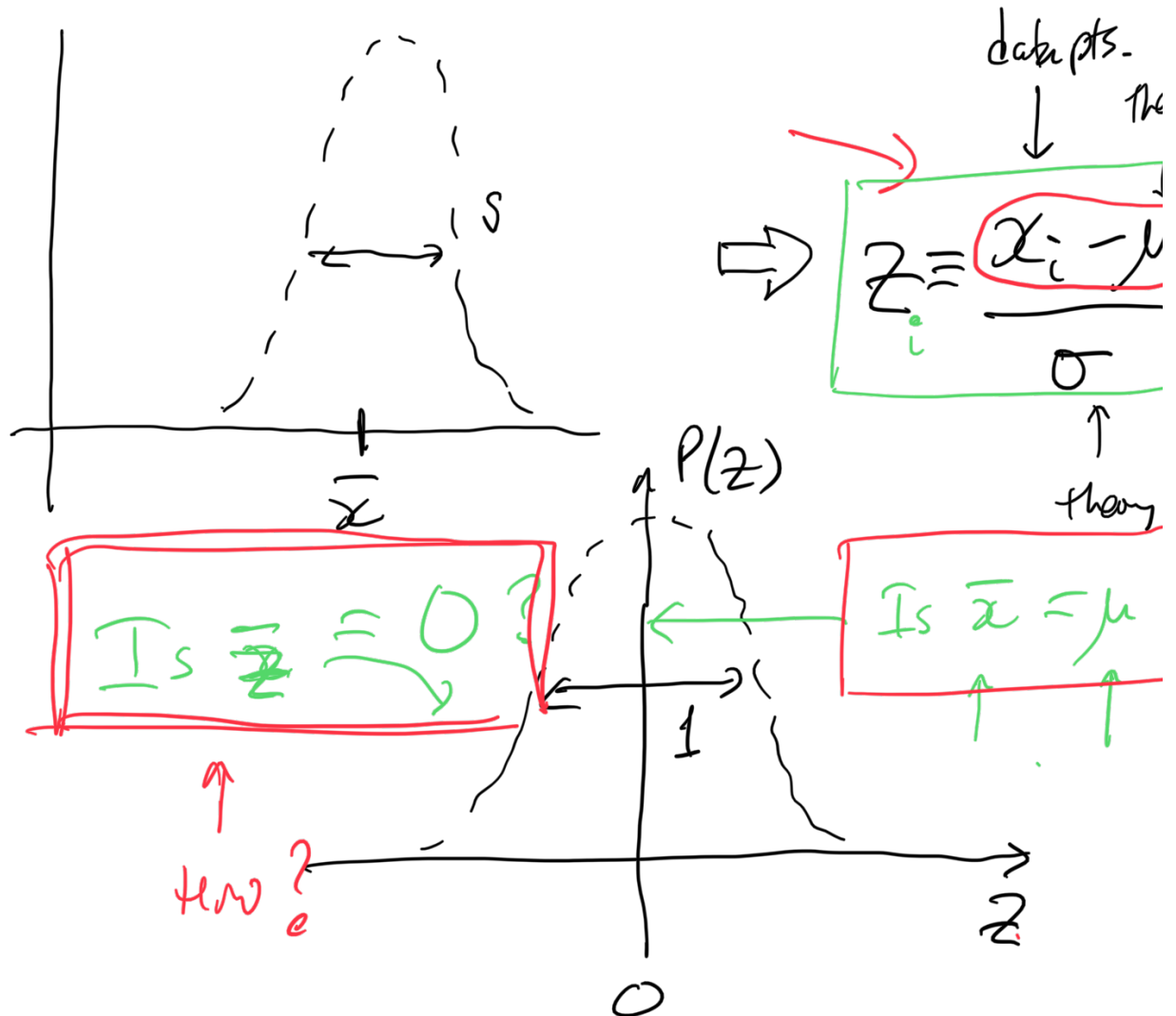


Bigger



Z-Scores

→ normalization process



Is the mean of the
z-distribution = 0?

→

1

single
val

$$\rightarrow Z_{\alpha} \equiv \frac{\bar{x} - \mu}{\sigma / \sqrt{N}}$$

$$Z_{\alpha} = \frac{\text{Difference} \leftarrow}{\text{error bar} \leftarrow}$$

= # of error bars

↖
expected
uncertainty
in
 μ

Standard Error in the Mean

$$(SEM) = \frac{\sigma}{\sqrt{N}}$$

$$Z_{\alpha} = -0.90$$

~ 0.9 error bars
low.

Does the data agree with theory?

① Is $\bar{x} = \mu$?

② Is $\bar{x} \geq \mu$?

③ Is $\bar{x} \leq \mu$?

DECIDE

How large is large enough?

NULL HYPOTHESIS

1 -

...

→ assume theory is correct
↳ look for problems.

CONCLUSIONS :

① problem → REJECT THE
WRONG NULL HYPOTHESIS

② no problem → FAIL TO
REJECT

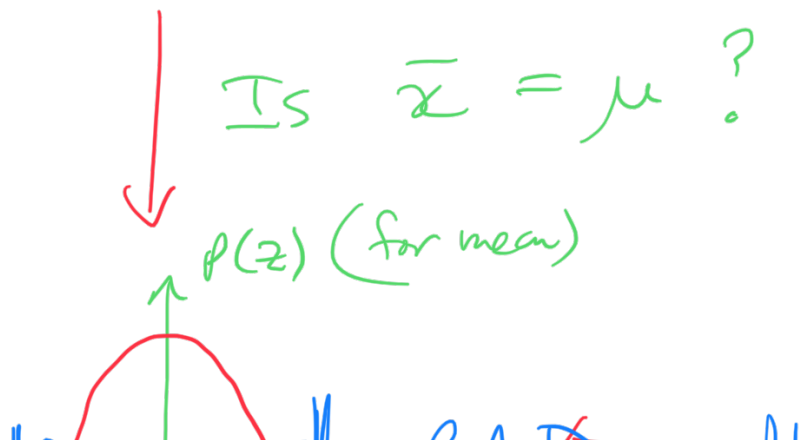
NOT WRONG
YET

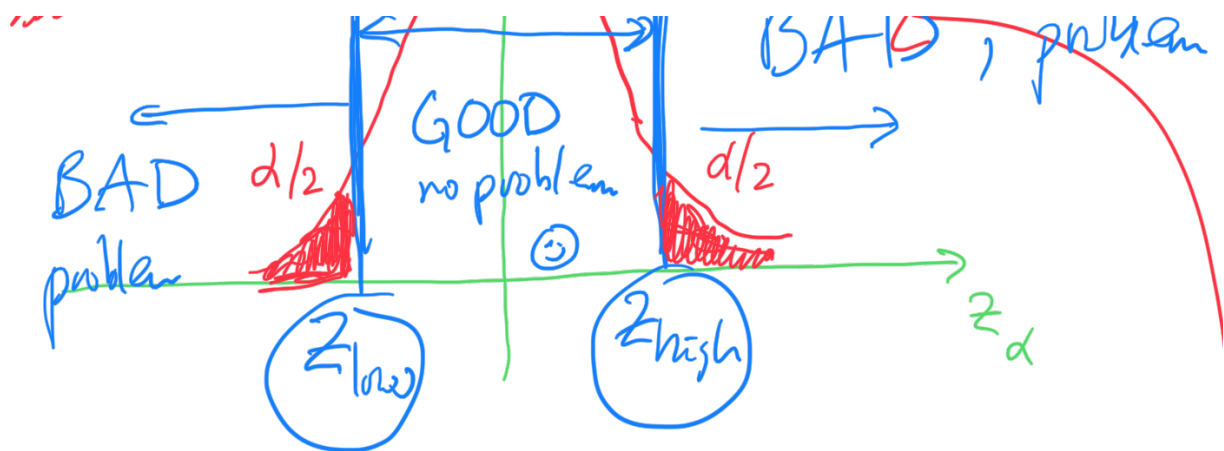
$$Z_{\alpha} = -0.89$$

Case 1 :

Is $\bar{x} = \mu$?

Gaussian →
~~not~~





Experiment:

$N = 1000$ pts.

$\hookrightarrow z_\alpha$

Do entire expt.

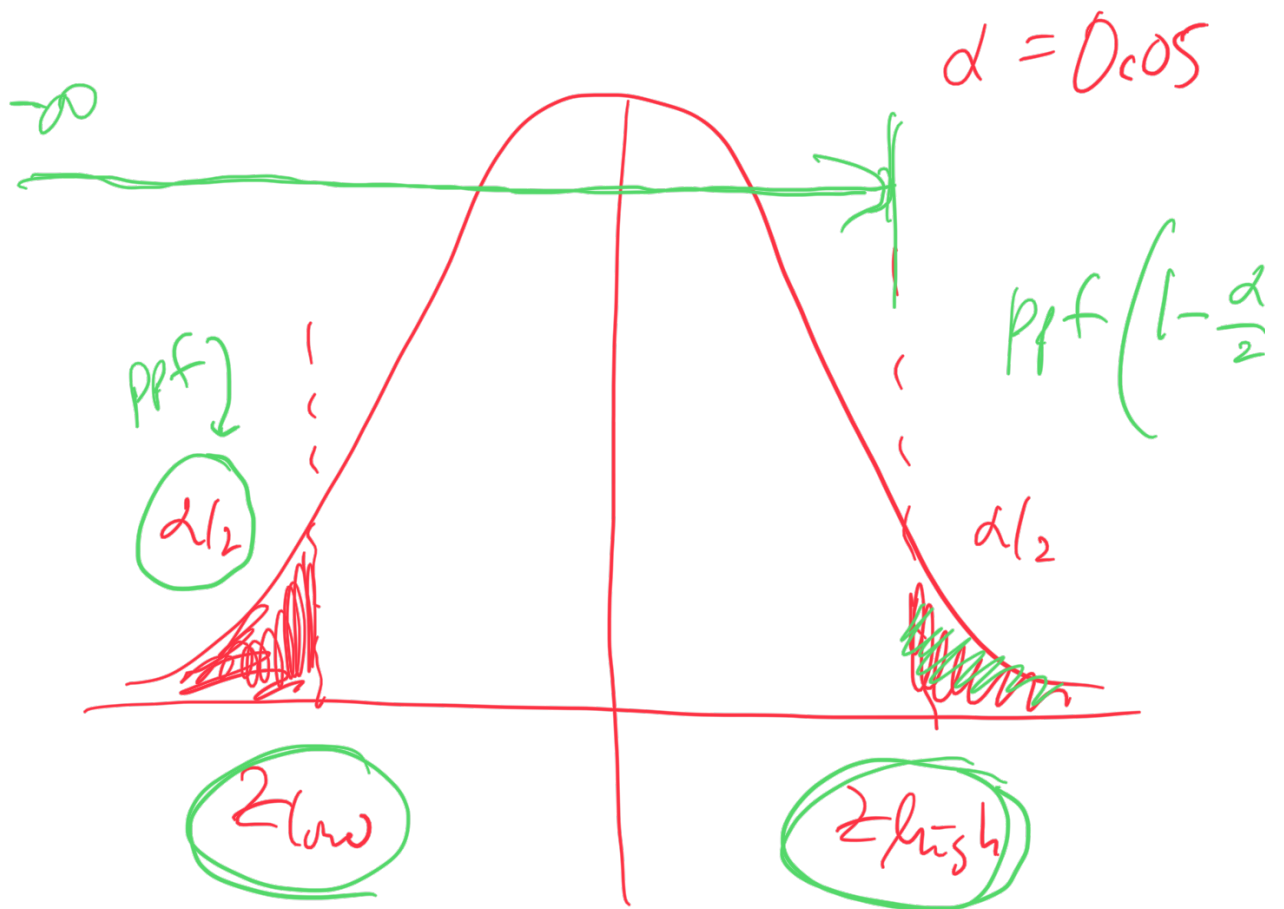
10,000 tries

Choice: how confident do we want to be?

Eng. \rightarrow 95% confidence level.

TYPE I Error prob. \rightarrow 5% possibility that we are wrong

$$\alpha = 0.05$$



Percentile Point Function (PPF)

Inverse of CDF

$$-1.96 \dots + 1.96$$

$$\begin{array}{c} \uparrow \\ -1.96\sigma \dots + 1.96\sigma \quad 95\% \end{array}$$

$$\boxed{z_{low}, z_{high}}$$

$$-1.96 \quad + 1.96$$