/8 H_0: aliens don't exist.

23. H_a: Aliens do exist.

α low (skeptine)

α high

H_0: Aliens do exist

H_a: Aliens don't exist

α low

α high

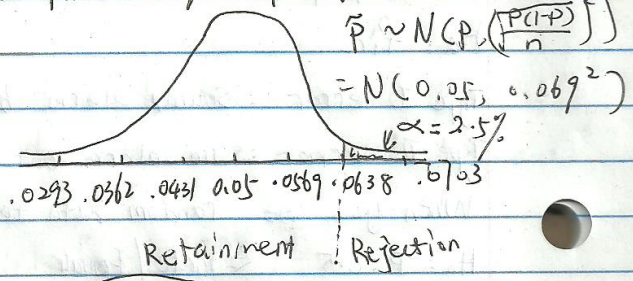
Uber fires baddrivers (% complains >5%) after 1000 video.

H_0: $p \leq .05$ (good)

H_a: $p > 0.05$ (Bad)

One-sided one-proposition

Z test (right-tailed)



Retainment Region $= (-\infty, p + Z_\alpha \sqrt{\frac{p(1-p)}{n}})$

$= (-\infty, 0.0638)$

John has 61 complains:

$\hat{p} = \frac{61}{1000} = 0.061$ = Retain Reg $\Rightarrow$ Keep drive.

		Decision: Ret (Keep)	Rej (Fire)	
(H_0 true)	Good	✓	Type I error	← Fire a good driver (low cost)
(H_a false)	Bad	type II error	✓	

Keep baddrive (high cost)

$\alpha = P($type I error$)$

min $P($type II error$) \Rightarrow \alpha \uparrow$ or $n \uparrow$

	Decision. (Retain H_0)	(Reject H_0)	
	Fire	Keep	
truth (H_0 true) Bad	✓	type I error ✓	← keep bad driver
(H_a ~~fa~~ false) Good	type II error		

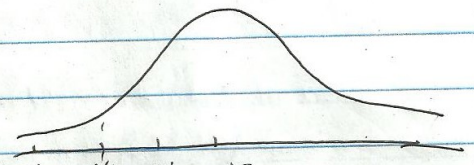
H_0: $p \geq 0.05$ (Bad)

H_a: $p < 0.05$ (Good)

test (left-tailed)

Rej Region $= (p - z_\alpha \sqrt{\frac{p(1-p)}{n}}, \infty)$

$= [0.0362, \infty)$



John has 61 complains.

$\hat{p} = \frac{61}{1000} = 0.061 \in$ Rej Reg $\Rightarrow$ Fire him

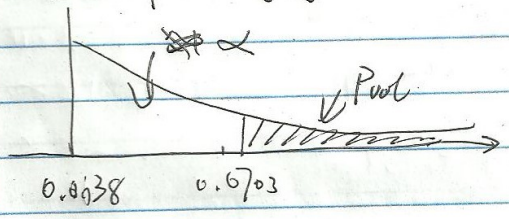
---

$P_{val} = P(\hat{p} > p \mid H_0 \text{ true})$ $\quad \hat{p} = 0.71$

$= P(\hat{p} > 0.71 \mid p = 0.05)$

$= P\left(\frac{\hat{p} - 0.05}{0.0069} > \frac{0.71 - 0.05}{0.0069}\right) = P(Z > 3.04) = 0.00118 \approx 0.1\%$

→ Prob of seeing your data or more extreme under the



$< \alpha$ ⇓ Reject.

$> \alpha$ ⇓ Retain

Stat sign