Data found in package: Lock5 Data

Wetsuits

head(Wetsuits)

	Wetsuit	Nowetsuit	Gender	Type
case 1 →	1.57	1.49	F	swimmer
	1.47	1.37	F	triathlete
	1.42	1.27	F	swimmer
	⋮	⋮		

sample $n = 12$

Paired data: each case generated 2 numbers

our focus is on difference.

Of interest μ_{Diff} = avg. difference in population

Sample data

list of differences:

0.08, 0.1, 0.15, ___

paired-t procedure – same as $\bar{X}_{Diff}$ = mean difference

- CI for μ_{Diff} $\qquad S$ = std. dev. ~~mean~~ sample
- hypothesis test: $H_0: \mu_{Diff} = 0$, $H_a: \mu_{Diff} \neq 0$

X <— Wetsuits$Wetsuit - Wetsuits$Nowetsuit

mean(~x) → m

sd(~x) → s

95% CI:

$$m \pm \underbrace{qt(0.975,\ df=11)}_{\text{in place of } z=1.96} \cdot \underbrace{s/\sqrt{12}}_{\text{est. of std. error}}$$

or

t.test(~x)

A = wait time for Andrea

$$f_A(a) = \frac{1}{5} e^{-a/5}, \quad a > 0$$

$$f_B(b) = \frac{1}{10} e^{-b/10}, \quad b > 0$$

#2 $Pr(X > 3Y)$

did w joint dist $f_{XY}(x,y) = \frac{1}{x^2 y^2}$

(a) $Pr(B < A)$

A, B ind.

joint pdf

$$f_{AB}(a,b) = f_A(a)\, f_B(b)$$

$$= \frac{1}{50} e^{-a/5} \cdot e^{-b/10}$$

$$Pr(B < A) = \int_0^\infty \int_b^\infty \frac{1}{50} e^{-a/5} e^{-b/10}\, da\, db$$

$$= \int_0^\infty e^{-b/10} \left(\int_b^\infty \frac{1}{50} e^{-a/5}\, da \right) db$$

$$= \int_0^\infty e^{-b/10} \frac{-5}{50} \Big[e^{-a/5} \Big]_b^\infty db$$

$$(0 - e^{-b/5})$$

$$= \int_0^\infty e^{-b/10} \cdot \frac{1}{10} e^{-b/5}\, db = \cdots = \frac{1}{3}$$

(b) In Andrea's line, find probability 8 or more people make it through in 30 mins.

Know: Wait times in line are exponentially-dist rate parameter $1/5$

Need Poisson dist. to count events of making it thru line

And need to adjust rate parameter to 30 min time scale.

Answer: $1 - ppois(7, \lambda = 6)$