Data frame in package Lock5Data

Wetsuits

head(Wetsuits)

	Wetsuit	NoWetsuit	Gender	Type
case 1 →	1.57	1.49	F	swimmer
	1.47	1.37	F	triathlete
	1.42	1.33	F	swimmer

sample $n = 12$

Paired data: each [illegible] are paired & analysis is done on the differences

Of interest: μ_{diff} = avg difference in population

sample data
list of differences
0.08, 0.1, 0.09, ...

paired t procedure = same as $\bar{x}_{diff}$ = mean difference
std dev s_d = [illegible] sample

- CI for μ_{diff}
- 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)

3

A = wait time for Andrea

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

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

#2 $Pr(X > 3Y)$

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

(a) $Pr(B < A)$

A, B ind.

joint pdf

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

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

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

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

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

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

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

(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: $1 - \text{ppois}(7, \lambda = 6)$