Discussion section: week of 21 - 25 May

Disc. Sec. 6 #1 :

AMS 7
21 May 18

(R · 63)

①

$\frac{26.0 \text{ kg} - 28.1 \text{ kg}}{28.1 \text{ kg}} = \frac{-2.1 \text{ kg}}{28.1 \text{ kg}} = -0.075$

the mean weight has declined 7.5% in 5 years : 1.5% decline each year

this diff. (is) large in practical terms

this is a 1-sample problem with a quant. continuous outcome: like the intertidal crabs study

[inf. summary]

unknown pop. quantity of main interest	μ = mean weight of all adult sea otters in the U.S., now
estimate of μ	$\bar{y} = 26.0$ kg
give or take for $\bar{y}$ as est. of μ	$\hat{SE}(\bar{y}) \doteq 0.6$ kg
95% CI for μ	$\bar{y} \pm t^{0.95}_{n-1} \cdot \hat{SE}(\bar{y}) = 26.0 \text{ kg} \pm 2.021 (0.62 \text{ kg})$

$= (26.0 \pm 1.2)$ kg

(2)

pop. — all adult E.S. sea otters, now

sample — the observed otters

stat. inf.

imag. data — all possible $\bar{y}$s

weight (kg.)

$N \doteq 600$

actual

likely IID

mean $\mu = ?$

SD $\sigma = ?$

biology

pop. hist.

hyp. IID

weight (kg.)

$n = 42$

mean $\bar{y} = 26.0$ kg

SD $s = 4.0$ kg

sample hist.

?

$n = 42$

mean $\bar{y} = ?$

ex. 27.1

26.0 kg

27.1

⋮

$M \to \infty$

long run mean — EV of $\bar{y}$ $= \mu$

est. long run SD — $\hat{SE}$ of $\bar{y}$ $\doteq 0.62$ kg

long run hist. (*)

EV of $\bar{y}$ =

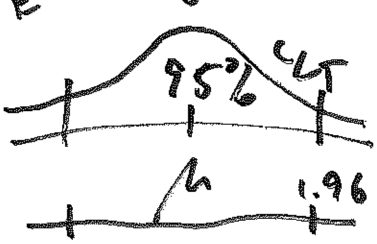
$$E_{IID}(\bar{y}) = \mu$$

$$\hat{SE}(\bar{y}) = \hat{SE}_{IID}(\bar{y}) = \frac{s}{\sqrt{n}}$$

$$= \frac{4.0 \text{ kg}}{\sqrt{42}} \doteq 0.62 \text{ kg}$$

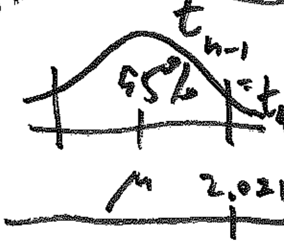
(*)

$\hat{SE}$ 0.6 kg



long-run hist. of $\bar{y}$

$\hat{SE}$ 0.6 kg (L-142)



long run hist of $\bar{y}$, accounting for $\hat{SE}$ uncertainty

95% CI for μ

(24.8 | 26.0) 27.2 kg — 28.1 (μ_0)

28.1 (not) in 95% CI, so

diff. between $\bar{y} = 26.0$ kg & $\mu_0 = 28.1$ kg (is) statsig ↔ hard to attribute diff (28.1 vs. 26.0) to unlucky random sampling) ↔ probably real (if you did census of all 600 otters, mean weight would not be 28.1)

theory: otters ok as far as weight is concerned ($\mu = \mu_0 = 28.1$ kg)

1(a) T

1(d) T

1(e) T

1(c) F, because CI says nothing about individual otters in sample; to make 1(c) T, 0.6 kg ~~4.0 kg~~

(95%) → 26.0 ± 2 (4.0 kg)