

CIMT Further Stats p24 Example

resistances 2314 2456 2389 2361 2360 2332 2402.

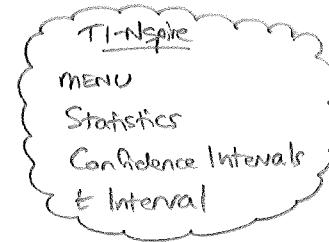
$X$  = resistance, in ohms.

we are given to assume  $X \sim N(\mu, \sigma^2)$

Sample mean,  $\bar{x} = 2373.43$

Sample std dev,  $s_{n-1} = 47.3633$

$n = 7$ .



so  $\bar{X} \sim N(\mu, \frac{\sigma^2}{7})$ . We estimate  $\sigma^2$  with  $s_{n-1}^2$  and as  $n$  is small, we use  $t_6$  distribution.

so 95% CI for  $\mu$  is  $\bar{x} \pm t_{6, 0.025} \sqrt{\frac{s_{n-1}^2}{7}}$

$$= 2373.43 \pm 2.44691 \sqrt{\frac{47.3633^2}{7}} \quad \text{where } \text{inv}(0.975, 6) = 2.44691$$

$$= (2329.62, 2417.23)$$

$$= \underline{(2330, 2417)} \text{ to 4sf.}$$

↑  
note argument are  
'opposite way round'  
from mathematical  
notation

and a 90% CI for  $\mu$  is  $\bar{x} \pm t_{6, 0.05} \sqrt{\frac{s_{n-1}^2}{7}}$

$$= 2373.43 \pm 1.94318 \sqrt{\frac{47.3633^2}{7}} \quad \text{where } \text{inv}(0.95, 6) = 1.94318$$

$$= (2338.64, 2408.21)$$

$$= \underline{(2339, 2408)} \text{ to 4sf.}$$