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 st.dev, $s_{n-1} = 47.3633$

$n = 7.$

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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 $\bar{x} \pm t_{6,0.025}\sqrt{\frac{s_{n-1}^2}{7}}$

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

note argument are 'opposite way round' from mathematical notation

$= (2329.62, 2417.23)$

$= (2330, 2417)$ to 4sf.

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

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

$= (2338.64, 2408.21)$

$= (2339, 2408)$ to 4sf.