Example 6.2

Research Hypothesis: Whether the mean systolic blood pressure is different to 120.

Hypothesis test: assuming underlying distribution of systolic b.p. is normally distributed, we are comparing a true population mean to a specified value, so the hypothesis test to use is one-sample t-test (two-tailed).

Hypotheses: $H_0 : \mu_0 = 120$

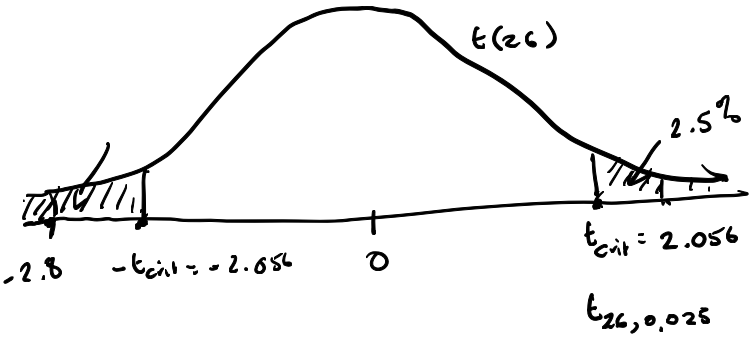
$H_1 : \mu_0 \neq 120$

Test statistic $T = \dfrac{\bar{x} - \mu_0}{s/\sqrt{n}} \sim t(n-1)$ under H_0

Observed test statistic: $n = 27$, $\bar{x} = 114.4$, $s = 9.7$

$$t_{obs} = \frac{114.4 - 120}{9.7/\sqrt{27}} = -2.8$$

Rejection Region:



p-value $= 2 \times P(t(26) > 2.8)$

$= 2 \times 0.004 = 0.008$

Test Decision: $t_{obs} < -t_{crit}$ so we can reject H_0 in favour of H_1 as the observed test statistic lies in the

rejection region

Test Conclusion: There is sufficient evidence to suggest that the mean seated systolic blood pressure is different than 120 mmHg.

For confidence interval for μ

$$\bar{x} \pm t(n-1;\ 0.025)\, s/\sqrt{n}$$

$$114.4 \pm 2.056 \times 9.7/\sqrt{27}$$

$$= (110.72, 119.08)$$

120 is not a plausible value in the 95% CI, and therefore agrees with our hypothesis test which found sufficient evidence that mean systolic b.p. is different to 120 mmHg.