CIMT Further Statistics – p82 Example

Assumption : Distribution of differences is symmetrical.

Justification : paired data
no assumptions about type of distribution

H_0 : median difference = 0. (weights make no difference) where difference = before − after

H_1 : median difference > 0 (weights make run faster)

Assume H_0 to be true.

$\alpha = 5\%$

1 tail test

So $W_+ = 1+2+3.5+5+6+8+9+10+11 = 55.5$

$W_- = 3.5+7 = 10.5$

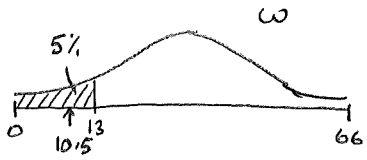
$55.5 + 10.5 = 66$ ↘ $\frac{1}{2} \times 11 \times 12$ ✓ check.

we had one tied pair of 0, so only 11 pieces of data, $n = 11$

now $W = \min(W_-, W_+) = 10.5$

lowest $W = 0$
highest $W = 66$

under H_0, W should be ≈ 33.



$P(W \leq 10.5)$ is what we want

From tables, $n = 11$, $P(W \leq 13) = 0.05$.

so we have $P(W \leq 10.5) < 0.05$

Hence we are in critical region, and we reject H_0

We have evidence to suggest that the median difference is greater than zero (i.e. weights make them run faster)