STAT212 Assignment 8

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April 15, 2021

Answer to Question 1

Using Excel we estimate the standard deviation of birthweights as follows:

$$\text{std.s boy birthweights} = 594.75$$
$$\text{std.s girl birthweights} = 542.18$$

Answer to Question 2

The parameters being tested are:

$$\sigma_B = \text{standard deviation of birthweights in Boys}$$

and

$$\sigma_G = \text{standard deviation of birthweights in Girls}$$

If the variation in birthweights is the same among baby boys and girls, then obviously $\sigma_B = \sigma_G$, in which case $\sigma_B/\sigma_G = \Lambda_0 = 1$, the null value.

Consequently, to test whether variation in birthweights is the same:

$$H_0 : \Lambda = 1$$

$$H_A : \Lambda \neq 1$$

Answer to Question 3

We first the value of the test statistic as follows:

$$F = \frac{s_1^2}{s_2^2}$$

We know:

$$s_1 = 594.75$$
$$s_2 = 542.18$$

Plugging these in:

$$F_0 = 1.20$$

The critical values are:

$$F_{1-\alpha/2} \text{ and } F_{\alpha/2} \text{ (Two tailed)}$$

with $df = (n_1 - 1, n_2 - 1)$.

We know:

$$\alpha = 0.1$$
$$n_1 = 103$$
$$n_2 = 97$$

Plugging these in:

$$F_{1-\alpha/2} = 0.72$$
$$F_{\alpha/2} = 1.39$$

The rejection region is:

$$F < 0.72 \text{ or } F > 1.39$$

The value of the test statistic does not fall in the rejection region, we do not reject the H_0.