Chapter 7
One-Way ANOVA

Abstract One-way ANOVA (analysis of variance) is a technique that generalizes the two-sample t-test to three or more samples. We test the hypotheses (specified here for \( k = 6 \) samples) about population means \( \mu_j \):

\[
H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 \\
H_1: \text{Not all } \mu_j \text{ are equal (} j = 1:6) 
\]

The test is based on the observed sample means \( \bar{x}_j \).

7.1 Data

We will explore ANOVA with an example from the chickwts dataset that is distributed with R. From the help file ?chickwts:

An experiment was conducted to measure and compare the effectiveness of various feed supplements on the growth rate of chickens. Newly hatched chicks were randomly allocated into six groups, and each group was given a different feed supplement. Their weights in grams after six weeks are given along with feed types.
Fig. 7.1  Use the

Data ▶ Data in packages ▶ Read data set from an attached package... menu item. Double-click to select the datasets package, double-click again to select the chickwts dataset, and then click OK.

Fig. 7.2  chickwts is now listed as the active dataset on the Rcmdr menu. All menu items on the Rcmdr menu refer to variables that are columns in the active dataframe. Put the cursor in cell A1 of a new workbook and use the right-click Get Active DataFrame menu item to get the chickwts data into the Excel worksheet, where we can look at it.