# Data Science in Aerospace

## *Descriptive Statistics*

isec lisboa

ESCOLA
DE GESTÃO,
ENGENHARIA
E AERONÁUTICA

# 1 Test Flight Performance

The following values represent the fuel consumption (in liters per hour) of 7 different aircraft during a test flight:

$$166, \ 158, \ 202, \ 166, \ 150, \ 86, \ 135.$$

- Sketch the corresponding dot plot. Calculate and interpret the following parameters: mean, mode, median, range, mean absolute deviation, variance, standard deviation, and coefficient of variation.

# 2 Fuel Consumption Analysis

The table below presents the fuel consumption values (in liters) for 66 flights conducted by an airline:

| | | | | | |
|---|---|---|---|---|---|
| 649 | 719 | 1863 | 129 | 3498 | 1295 |
| 2125 | 6849 | 938 | 97 | 219 | 4169 |
| 465 | 319 | 1045 | 2385 | 890 | 1197 |
| 444 | 1388 | 812 | 6468 | 2468 | 997 |
| 367 | 1493 | 775 | 6725 | 450 | 3495 |
| 749 | 569 | 2295 | 7495 | 2445 | 6791 |
| 890 | 3955 | 1269 | 3377 | 4356 | 3679 |
| 1197 | 525 | 985 | 650 | 2997 | 357 |
| 1630 | 1339 | 1194 | 4996 | 2576 | 1190 |
| 1185 | 997 | 746 | 1243 | 2150 | 168 |
| 4987 | 1383 | 1956 | 277 | 782 | 1520 |

- Represent and interpret the information contained in this data appropriately.

# 3   Altimeter Calibration

An experiment was conducted with an aircraft's altimeter to evaluate its accuracy in measuring altitude changes during flight maneuvers. For this purpose, the altitude deviations (in feet) were recorded at 10 different points, as shown below:

$$10.6 \quad 10.7 \quad 10.1 \quad 10.9 \quad 10.8$$
$$10.2 \quad 11.0 \quad 10.3 \quad 10.5 \quad 10.9$$

- Present three measures of central tendency and three measures of dispersion for the observed data, interpret them, and suggest which is the most appropriate within each group of measures.

# 4   Fuel Capacity Analysis

Consider a sample of 100 airplanes of a particular model, where the manufacturer specifies a fuel capacity of 450 gallons. The observed fuel capacities are grouped into 9 classes, as shown in the table below:

| Fuel Capacity (gallons) | Frequency |
|:---:|:---:|
| $420 - 424$ | 2 |
| $425 - 429$ | 5 |
| $430 - 434$ | 6 |
| $435 - 439$ | 14 |
| $440 - 444$ | 18 |
| $445 - 449$ | 27 |
| $450 - 454$ | 19 |
| $455 - 459$ | 8 |
| $460 - 464$ | 1 |

- Calculate sample measures of location, dispersion, and skewness, and interpret the results.