Supplement to Chapter 14: Statistics

Amendments

Table 14.2, page 118: Last column, third row: Delete "3.3" and substitute "3.2".

14.6 Two-Dimensional Populations

Replace the equation at the bottom of page 121 by the equation:

$$(x - \mu_x)/\sigma_x = \pm (y - \mu_y)/\sigma_y.$$

Add the paragraph:

> The covariance σ_{xy} (see below) may be positive or negative. If σ_{xy} is positive, then one must choose the positive sign on the right hand side of the above equation. If σ_{xy} is negative, then one must choose the negative sign on the right hand side of the above equation.

14.7.2 Principal Axes

Note that in the title of this section the word "Principle", which is wrong, has been replaced by the word "Principal", which is correct. (These two words are pronounced the same way but have different meanings.)

Replace the other two instances of "principle", in the first and last lines of this section (pages 123 and 124), by the word "principal".

Exercises

Do the exercises in this chapter on pages 117, 120, 122, and 124.

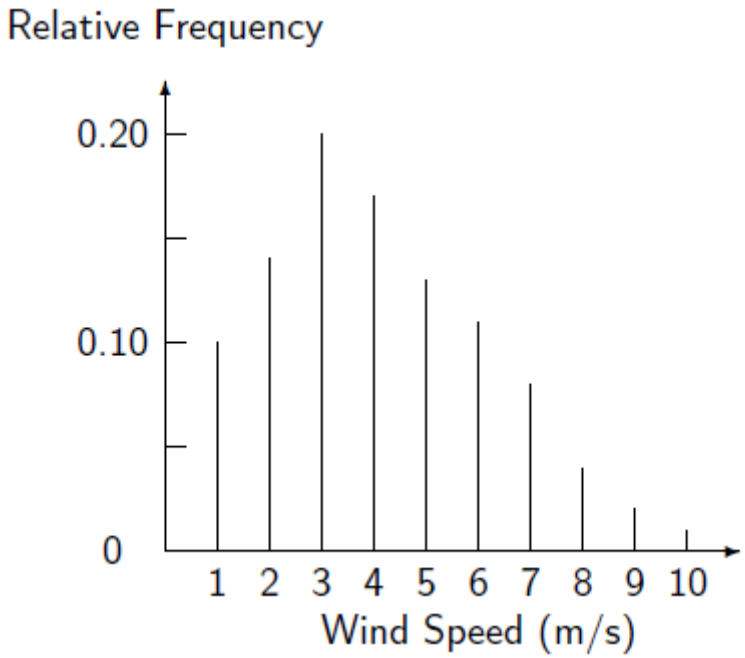
In addition, read **15.4.2 Testing Correlation Coefficients** in Chapter 15, and do the exercise on page 132.

Statistics of Frequency Distributions

The following table shows an example of a distribution of wind speeds at a particular site, and the figure shows a bar chart of the data in the table.

Wind Speed Distribution

Wind speed (m/s)	Relative Frequency
1	0.10
2	0.14
3	0.20
4	0.17
5	0.13
6	0.11
7	0.08
8	0.04
9	0.02
10	0.01



When the n numbers x_i in a population have relative frequencies f_i, the mean μ and variance σ^2 of the population must be calculated as follows:

$$\mu = f_1x_1 + \ldots + f_nx_n$$

and

$$\sigma^2 = f_1(x_1 - \mu)^2 + \ldots + f_n(x_n - \mu)^2 = f_1 x_1^2 + \ldots + f_n x_n^2 - \mu^2.$$

Exercise

Calculate the mean and standard deviation of the wind speeds in the above table. The power in the wind is proportional to u^3, where u is the wind speed. Calculate the values of $(\mu(u))^3$ and $\mu(u^3)$. Which of these two quantities is best for estimating the mean power in the wind?
