



Applied Statistics in Transport
Exercises: Descriptive Statistics

Exercises with or without R:

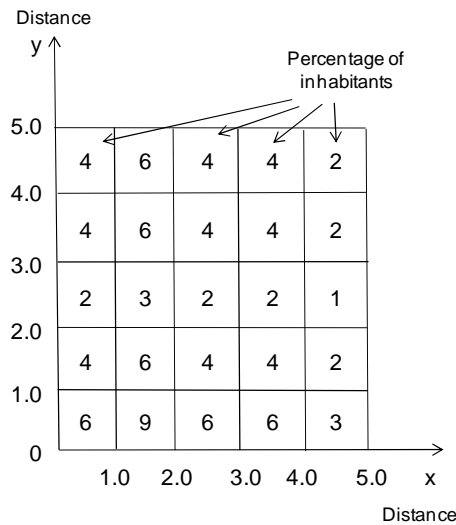
1. A vehicle drives a distance of 25km. The parts 1 to 7 of the road are in different condition, so that different speed limits are imposed.

j	Distance D_i [km]	Speed s_j [km/h]
1	1	30
2	1	45
3	12	50
4	3	65
5	1	80
6	2	100
7	5	120
Total	25	

Determine the average speed over the whole distance of 25km, given that the speeds listed in the above table are driven. What is the overall travel time?

2. Prove that the sum of the deviations of the numbers x_1, x_2, \dots, x_n of the arithmetic mean \bar{x} equals zero.

3. Location decision: The following percentages of inhabitants are given for region A (distances are measured in kilometres)



For answering the following questions we assume that the inhabitants are uniformly distributed within the quadrates, i.e. the inhabitants are concentrated in the centre of the quadrates.

- Determine the coordinates of the geographic centre GC for the whole region.
- Determine the coordinates of the centre of gravity for the inhabitants IC for the whole region.
- Where is the mode MOD located?
- Determine the coordinates for the median point MED.
- Determine the grids(quadrates) with the highest potential of inhabitants, that means the so called potential point POT. Use the weights below $w(d)$ as a function of the distance d .

0	0	0	0	0	0	0
0	0	0.2	0.3	0.2	0	0
0	0.2	0.6	0.8	0.6	0.2	0
0	0.3	0.8	P_i	0.8	0.3	0
0	0.2	0.6	0.8	0.6	0.2	0
0	0	0.2	0.3	0.2	0	0
0	0	0	0	0	0	0

- Which of the five above determined measures of location do you consider to be most suitable for determining the location of:
 - Fire station
 - Television transmitter
 - Department store