

### Practicals 10 – transformation and non-parametrics

1. Hair length was measured in two samples of ten randomly chosen male students doing their studies at the faculty of science and faculty of law.

The measured hair length (in cm) were

F. Sci.: 14, 17, 29, 14, 14, 11, 39, 23, 18, 8, 51, 36

F. Law: 6,8, 2, 3, 4,2,10,21, 5, 8, 3, 5

Does the hair length of guys significantly differ depending at which faculty they do their studies?

2. Number of vacular plant species was recorded in 10 countries. How does the number of species depend on country area?

area [km <sup>2</sup> ]	species
5	250
30	600
59	550
52365	2900
180964	3830
65	650
25160	2100
2300	980
32150	2300
56861	2800
150670	3300
98765	3050
143458	3489

3. Aggressiveness of football fans was monitored at 20 football matches of different leagues (0 = district league, 5 = Champions' league) on an ordinal scale (0 = calm fans, 1 = loud support to players, 2 = loud support + some fireworks, 3 = loud support + many fireworks, 4 = fireworks thrown on the pitch, 5 = fans running on the pitch, 6 = fans running on the pitch and attacking the referee).

The resulting data were as follows:

match ID	league	aggressiveness
1	2	0
2	0	3
3	2	4
4	3	3
5	4	0
6	5	1
7	2	3
8	4	4
9	2	4
10	3	5
11	4	0
12	3	1
13	2	4
14	3	5

15	1	5
16	2	2
17	1	4
18	0	3
19	5	2
20	5	3

Is aggressivness of fans associated with league level?

4. During a final of pizza tasting competition, 10 evaluators tasted pairs of pizza samples prepared by cooks Francesco and Giacomo. Their evaluation (on a scale 1-5, 1 is best, 5 worst) was following:

Francesco: 1,2,1,1,3,1,1,2,1,2

Giacomo: 1,3,2,3,1,2,1,2,2,1

Is there any significant difference in quality of pizza, these guys make? Who will be the winner of the competition?

5. Lettuce varieties were evaluated for their taste. They also differed in leaf color. The taste was ranked on the scale (1=delightful, 2=very good, 3=acceptable, 4=bitter, not really good, 5=ugly disgusting).

The resulting values are summarized here:

red leaved varieties:

1,2,1,2,1,2,2,1,1,1,3,1,1,3,1,3,1,3,3,2,2,3,1,2,3,1,1,4,1,2,2,2,2,2,1,2,3,1,1,2,2,2,2,2,1,1,2,2,3,1,2,1,1,2,2,1,1,2

green leaved varieties:

4,2,2,1,2,2,1,3,2,1,2,4,3,3,3,3,2,3,2,1,4,2,2,3,2,2,1,1,5,3,3,2,3,2,1,3,3,2,2,1,2,2,3,3,3,1,1,3,2,3,3,3,2,1,2,3,2,2,3,1

Is there an association between leaf color and taste of lettuce?

6. 24 people read 24 books (one each) written by four different authors (6 by each). After reading the book, they were asked to rate the book on the scale: 1 – annoying, 2 – boring, 3 – mostly boring with some enjoyable parts, 4 – enjoyable, 5 – wonderful.

The resulting data are summarized below:

Ernest Hemingway: 4, 5, 4, 4, 3, 4

Charles Dickens: 2, 4, 5, 5, 2, 4

Alexander Pushkin: 3, 4, 5, 4, 3, 3

Lev Tolstoy: 2, 1, 3, 2, 3, 2

Is there any significant difference in rating among these authors?

Who of them has the highest average rating?