

## 4 DATA:

### STATISTICKÁ ANALÝZA VÍCEROZMĚRNÝCH DAT

#### 4.9 Úlohy

S využitím modulu Vícerozměrná data programového systému ADSTAT, resp. programu STATGRAPHICS, SCAN, MINITAB, STATISTICA, S-Plus, atd. je třeba analyzovat dále uvedené úlohy. Úlohy jsou rozděleny do pěti kapitol: B4 (farmakologická a biochemická data), C4 (chemická a fyzikální data), E4 (environmentální, potravinářská a zemědělská data), H4 (hutní a mineralogická data) a S4 (ekonomická a sociologická data).

#### 4.9.1 Analýza farmakologických a biochemických dat

##### Úloha B4.01 Chromatografické chování farmakologických sloučenin (EDA, PCA, CLU)

*Data:* Datový soubor GIUSEPPE obsahuje  $100 \times R_F$  pro 20 sloučenin (řádky, jména byla zkrácena na max. 8 písmen) a 18 elučních činidel (sloupce), představujících zde proměnné:  $B401i$  název vzorku,  $B401x1$  Toluén : aceton : ethanol : 30% amoniak = 45 : 45 : 7 : 3,  $B401x2$  Ethylacetát : benzen : methanol : 30% amoniak = 60 : 35 : 6.5 : 2.5,  $B401x3$  Benzen : dioxan : ethanol : 30% amoniak = 50 : 40 : 7.5 : 2.5,  $B401x4$  Methanol : 30% amoniak = 100 : 1.5,  $B401x5$  Benzen : 2-propanol : methanol : 30% amoniak = 70 : 30 : 20 : 5,  $B401x6$  Ethylacetát : methanol : 30% amoniak = 85 : 10 : 5,  $B401x7$  Cyklohexan : toluén : diethylamin = 65 : 25 : 10,  $B401x8$  Cyklohexan : toluén : diethylamin = 75 : 15 : 10,  $B401x9$  Cyklohexan : benzen : metanol : diethylamin = 70 : 20 : 10 : 5,  $B401x10$  Chloroform : aceton : diethylamin = 50 : 40 : 10,  $B401x11$  Cyklohexan : chloroform : diethylamin = 50 : 40 : 10,  $B401x12$  Benzen : ethylacetát : diethylamin = 50 : 40 : 10,  $B401x13$  Xylen : methylethylketon : methanol : diethylamin = 40 : 40 : 6 : 2,  $B401x14$  Diethylether : diethylamin = 95 : 5,  $B401x15$  Ethylacetát : chloroform = 50 : 50,  $B401x16$  Ethylacetát : chloroform [A] = 50 : 50,  $B401x17$  Butanol : methanol = 40 : 60,  $B401x18$  Butanol : methanol [A] = 40 : 60, kde [A] značí, že byl užit 0.1M methanolát draselný.

Eluent	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$	$x_{10}$	$x_{11}$	$x_{12}$	$x_{13}$	$x_{14}$	$x_{15}$	$x_{16}$	$x_{17}$	$x_{18}$
Atropine	20	16	29	23	62	33	04	02	13	47	25	42	18	12	00	00	05	08
Biperide	91	90	87	68	92	87	73	72	64	85	81	86	68	94	11	40	40	65
Caffeine	55	42	52	68	77	54	8	5	13	60	30	51	41	20	13	12	54	57
Cocaine	81	82	81	71	87	82	46	41	38	81	72	80	52	72	6	24	30	57
Codeine	38	31	44	39	71	43	12	9	16	49	29	36	22	14	0	0	15	21
Cyclizin	71	72	80	64	85	80	49	47	40	75	71	73	39	59	2	9	34	54
Diazepam	76	79	80	78	85	80	28	21	29	80	61	75	72	54	54	50	85	87
Ketamine	77	79	80	76	86	79	71	33	32	81	66	76	67	66	27	37	66	79
Lignocaine	77	79	80	73	86	80	35	30	28	84	73	77	66	64	25	54	68	84
Lorazepam	47	34	53	77	73	46	2	0	12	52	7	22	47	8	28	15	85	79
Mebeveri	85	90	90	65	90	85	43	33	38	88	70	87	62	76	5	29	29	53
Methadon	85	84	88	48	89	83	63	64	48	85	73	86	38	86	1	10	13	29
Morphine	18	9	15	39	56	20	2	0	5	20	2	8	13	3	0	1	16	18
Naloxone	48	40	62	75	79	48	15	11	22	52	26	40	60	21	18	21	67	77
Papaverine	68	66	76	79	88	71	12	7	18	78	56	62	54	30	28	41	76	80
Pentazoc	72	66	81	65	87	76	22	18	26	69	41	54	39	44	2	11	32	59
Phenacet	64	58	62	79	87	66	4	1	13	68	18	41	58	24	41	40	86	84
Phenazon	66	53	70	83	86	65	30	22	24	77	60	66	45	54	15	21	68	74
Prazepam	81	83	86	83	88	81	41	31	35	83	66	82	75	74	65	67	86	88
Procaine	64	60	70	65	82	73	8	5	16	66	24	54	37	50	1	11	29	53

### Úloha B4.02 Účinky neuroleptik při tlumení rozličných psychóz (EDA, PCA, CLU)

Data: Charakter proměnných (převrácená hodnota mediánové účinné dávky 1/ED50 [kg/mg]): *B402i* název neuroleptika, *B402x1* potlačení nervozity, *B402x2* potlačení stereotypního chování, *B402x3* potlačení záchvatu a třesu, a *B402x4* dávka smrtícího účinku.

<i>B402i</i>	<i>B402x1</i> <i>Apo-Agitace</i>	<i>B402x2</i> <i>Apo-Stereotypy</i>	<i>B402x3</i> <i>Try-Seizures</i>	<i>B402x4</i> <i>Nep-Mortality</i>	Celkově
1 Chlorpromazine	3.846	3.333	1.111	1.923	10.219
2 Promazine	0.323	0.213	0.108	1.429	2.073
3 Trifluoperazine	27.027	17.857	0.562	0.140	45.586
4 Fluphenazine	17.857	15.385	1.695	1.075	36.012
5 Perphenazine	27.027	27.027	1.961	2.083	58.098
6 Thioridazine	0.244	0.185	0.093	1.333	1.855
7 Pifluthixol	142.857	142.857	20.408	163.934	470.056
8 Thiothixene	4.348	4.348	0.047	0.345	9.088
9 Chorprothixene	5.882	2.941	4.545	4.167	17.535
10 Spiperone	62.500	47.619	11.765	0.847	122.731
11 Haloperidol	52.632	62.500	1.282	0.568	116.982
12 Azaperone	2.941	1.282	2.222	3.030	9.475
13 Pipamperone	0.327	0.187	1.724	0.397	2.635
14 Pimozide	20.408	20.408	0.107	0.025	40.948
15 Metitepine	15.385	10.204	10.204	27.027	62.820
16 Clozapine	0.161	0.093	0.327	0.323	0.904
17 Perlapine	0.323	0.323	0.370	0.067	1.083
18 Sulpiride	0.047	0.047	0.003	0.001	0.098
19 Butaclamol	10.204	9.091	1.471	0.025	20.791
20 Molindone	7.692	7.692	0.140	0.006	15.530
Celkem	402.031	373.592	60.145	208.745	1044.51

### Úloha B4.03 Analýza psychosociálních vlivů na výskyt rakoviny prsu (EDA, PCA, CLU)

Data: Charakter proměnných: *B403x1* binární proměnná stavu ženy před přechodem 0 a po přechodu 1, *B403x2* nespojitá kvantitativní proměnná věku ženy, *B403x3* a *B403x4* nominální proměnná ke klasifikaci povahy, nálady a pocitů stupněm 0, 1, a 2, *B403x5* až *B403x9* pořadová kvalitativní proměnná, vyjadřující na stupnici 0 až 10 míru: *B403x5* nepřátelství, *B403x6* kritiku ostatních a okolí, *B403x7* paranoidní nepřátelství, *B403x8* sebekritiku a *B403x9* vlastní vinu, *B403x10* věk ženy, ve kterém se u ní objevila první menstruace, *B403x11* a *B403x12* jsou binární proměnné, značící přítomnost či nepřítomnost *B403x11* alergie a *B403x12* štítné žlázy, *B403x13* kvantitativní proměnná tělesné hmotnosti v kg.

<i>x1</i>	<i>x2</i>	<i>x3</i>	<i>x4</i>	<i>x5</i>	<i>x6</i>	<i>x7</i>	<i>x8</i>	<i>x9</i>	<i>x10</i>	<i>x11</i>	<i>x12</i>	<i>x13</i>
1	49	0	2	3	7	0	6	2	15	1	1	52.46
0	59	0	2	2	6	3	7	2	17	1	1	60.83
0	49	2	0	6	8	4	9	0	11	1	0	48.70
0	58	0	2	1	1	1	7	3	14	1	1	57.33
1	49	0	2	1	0	0	3	0	13	0	1	64.26
1	43	0	2	0	2	0	4	0	11	1	0	53.90
0	46	1	1	4	7	0	8	1	16	1	1	52.45
0	59	0	2	7	6	3	4	0	14	1	1	66.18
0	53	0	1	4	8	0	1	2	14	1	0	49.54
0	51	1	0	4	3	0	7	1	11	1	1	53.88
0	50	2	0	10	0	0	3	1	21	0	0	58.46
1	50	1	1	3	8	4	2	0	16	1	1	50.22

### Úloha B4.04 Popis a třídění polétavých mšic (EDA, CORA, PCA, FACT, CLU)

Data: Charakter proměnných: *B404x1* délka těla, *B404x2* šířka těla, *B404x3* délka předního křídla, *B404x4* délka zadního křídla, *B404x5* počet průduchů, *B404x6* délka tykadla I, *B404x7* délka tykadla II, *B404x8* délka tykadla III, *B404x9* délka tykadla IV, *B404x10* délka tykadla V, *B404x11* počet tykadlových ostnů, *B404x12* délka posledního článku nohy, *B404x13* délka holeně, tibia, *B404x14* délka stehna, *B404x15* délka sosačky, *B404x16* délka kladélka, *B404x17* počet kladélkových trnů, *B404x18* řitní otvor, *B404x19* počet háčků zadních křídel.

<i>x1</i>	<i>x2</i>	<i>x3</i>	<i>x4</i>	<i>x5</i>	<i>x6</i>	<i>x7</i>	<i>x8</i>	<i>x9</i>	<i>x10</i>	<i>x11</i>	<i>x12</i>	<i>x13</i>	<i>x14</i>	<i>x15</i>	<i>x16</i>	<i>x17</i>	<i>x18</i>	<i>x19</i>
21.2	11.0	7.5	4.8	5.0	2.0	2.0	2.8	2.8	3.3	3	4.4	4.5	3.6	7.0	4.0	8	0	3.0
20.2	10.0	7.5	5.0	5.0	2.3	2.1	3.0	3.0	3.2	5	4.2	4.5	3.5	7.6	4.2	8	0	3.0
20.2	10.0	7.0	4.6	5.0	1.9	2.1	3.0	2.5	3.3	1	4.2	4.4	3.3	7.0	4.0	6	0	3.0
22.5	8.8	7.4	4.7	5.0	2.4	2.1	3.0	2.7	3.5	5	4.2	4.4	3.6	6.8	4.1	6	0	3.0
20.6	11.0	8.0	4.8	5.0	2.4	2.0	2.9	2.7	3.0	4	4.2	4.7	3.5	6.7	4.0	6	0	3.0
19.1	9.2	7.0	4.5	5.0	1.8	1.9	2.8	3.0	3.2	5	4.1	4.3	3.3	5.7	3.8	8	0	3.5
20.8	11.4	7.7	4.9	5.0	2.5	2.1	3.1	3.1	3.2	4	4.2	4.7	3.6	6.6	4.0	8	0	3.0
15.5	8.2	6.3	4.9	5.0	2.0	2.0	2.9	2.4	3.0	3	3.7	3.8	2.9	6.7	3.5	6	0	3.5
16.7	8.8	6.4	4.5	5.0	2.1	1.9	2.8	2.7	3.1	3	3.7	3.8	2.8	6.1	3.7	8	0	3.0
19.7	9.9	8.2	4.7	5.0	2.2	2.0	3.0	3.0	3.1	0	4.1	4.3	3.3	6.0	3.8	8	0	3.0
10.6	5.2	3.9	2.3	4.0	1.2	1.0	2.0	2.0	2.2	6	2.5	2.5	2.0	4.5	2.7	4	1	2.0
9.2	4.5	3.7	2.2	4.0	1.3	1.2	2.0	1.6	2.1	5	2.4	2.3	1.8	4.1	2.4	4	1	2.0
9.6	4.5	3.6	2.3	4.0	1.3	1.0	1.9	1.7	2.2	4	2.4	2.3	1.7	4.0	2.3	4	1	2.0
8.5	4.0	3.8	2.2	4.0	1.3	1.1	1.9	2.0	2.1	5	2.4	2.4	1.9	4.4	2.3	4	1	2.0

11.0	4.7	4.2	2.3	4.0	1.2	1.0	1.9	2.0	2.2	4	2.5	2.5	2.0	4.5	2.6	4	1	2.0
18.1	8.2	5.9	3.5	5.0	1.9	1.9	1.9	2.7	2.8	4	3.5	3.8	2.9	6.0	4.5	9	1	2.0
17.6	8.3	6.0	3.8	5.0	2.0	1.9	2.0	2.2	2.9	3	3.5	3.6	2.8	5.7	4.3	10	1	2.0
19.2	6.6	6.2	3.4	5.0	2.0	1.8	2.2	2.3	2.8	4	3.5	3.4	2.5	5.3	3.8	10	1	2.0
15.4	7.6	7.1	3.4	5.0	2.0	1.9	2.5	2.5	2.9	4	3.3	3.6	2.7	6.0	4.2	8	1	3.0
15.1	7.3	6.2	3.8	5.0	2.0	1.8	2.1	2.4	2.5	4	3.7	3.7	2.8	6.4	4.3	10	1	2.5
16.1	7.9	5.8	3.7	5.0	2.1	1.9	2.3	2.6	2.9	5	3.6	3.6	2.7	6.0	4.5	0	1	2.0
19.1	8.8	6.4	3.9	5.0	2.2	2.0	2.3	2.4	2.9	4	3.8	4.0	3.0	6.5	4.5	0	1	2.5
15.3	6.4	5.3	3.3	5.0	1.7	1.6	2.0	2.2	2.5	5	3.4	3.4	2.6	5.4	4.0	0	1	2.0
14.8	8.1	6.2	3.7	5.0	2.2	2.0	2.2	2.4	3.2	5	3.5	3.7	2.7	6.0	4.1	0	1	2.0
16.2	7.7	6.9	3.7	5.0	2.0	1.8	2.3	2.4	2.8	4	3.8	3.7	2.7	5.7	4.2	0	1	2.5
13.4	6.9	5.7	3.4	5.0	2.0	1.8	2.8	2.0	2.6	4	3.6	3.6	2.6	5.5	3.9	0	1	2.0
12.9	5.8	4.8	2.6	5.0	1.6	1.5	1.9	2.1	2.6	5	2.8	3.0	2.2	5.1	3.6	9	1	3.0
12.0	6.5	5.3	3.2	5.0	1.9	1.9	2.3	2.5	3.0	5	3.3	3.5	2.6	5.4	4.3	8	1	2.0
14.1	7.0	5.5	3.6	5.0	2.2	2.0	2.3	2.5	3.1	5	3.6	3.7	2.8	5.8	4.1	0	1	2.0
16.7	7.2	5.7	3.5	5.0	1.9	1.9	2.5	2.3	2.8	5	3.4	3.6	2.7	6.0	4.0	0	1	2.5
14.1	5.4	5.0	3.0	5.0	1.7	1.6	1.8	2.5	2.4	5	2.7	2.9	2.2	5.3	3.6	8	1	2.0
10.0	6.0	4.2	2.5	5.0	1.6	1.4	1.4	2.0	2.7	6	2.8	2.5	1.8	4.8	3.4	8	1	2.0
11.4	4.5	4.4	2.7	5.0	1.8	1.5	1.9	1.7	2.5	5	2.7	2.5	1.9	4.7	3.7	8	1	2.0
12.5	5.5	4.7	2.3	5.0	1.8	1.4	1.8	2.2	2.4	4	2.8	2.6	2.0	5.1	3.7	8	0	2.0
13.0	5.3	4.7	2.3	5.0	1.6	1.4	1.8	1.8	2.5	4	2.7	2.7	2.1	5.0	3.6	8	1	2.0
12.4	5.2	4.4	2.6	5.0	1.6	1.4	1.8	2.2	2.2	5	2.7	2.5	2.0	5.0	3.2	6	1	2.0
12.0	5.4	4.9	3.0	5.0	1.7	1.5	1.7	1.9	2.4	5	2.7	2.7	2.0	4.2	3.7	6	1	2.0
10.7	5.6	4.5	2.8	5.0	1.8	1.4	1.8	2.2	2.4	4	2.7	2.6	2.0	5.0	3.5	8	1	2.0
11.1	5.5	4.3	2.6	5.0	1.7	1.5	1.8	1.9	2.4	5	2.6	2.5	1.9	4.6	3.4	8	1	2.0
12.8	5.7	4.8	2.8	5.0	1.6	1.4	1.7	1.9	2.3	5	2.3	2.5	1.9	5.0	3.1	8	1	2.0

#### Úloha B4.05 Odezva v obou očích na dva podněty u pacientů se sklerózou multiplex

Data:  $B405x1$  je věk pacienta [roky],  $B405x2$  celková odezva obou očí na první podnět S1 označená (S1L+S1R),  $B405x3$  rozdíl v odezvě levého a pravého oka na první podnět S1 označený |S1L-S1R|,  $B405x4$  celková odezva obou očí na druhý podnět S2 označená (S2L+S2R),  $B405x5$  rozdíl v odezvě levého a pravého oka na druhý podnět S2 označený |S2L-S2R|,  $B405x6$  pohlaví pacienta.

$B405x1$	$B405x2$	$B405x3$	$B405x4$	$B405x5$	$B405x6$
18	152.0	1.6	198.4	0.0	0
19	138.0	0.4	180.8	1.6	0
20	144.0	0.0	186.4	0.8	0
20	143.6	3.2	194.8	0.0	0
20	148.8	0.0	217.6	0.0	0
21	141.6	0.8	181.6	0.8	0
21	136.0	1.6	180.0	0.8	0
21	137.6	1.6	185.6	3.2	0
22	140.4	3.2	182.0	3.2	0
22	137.2	0.0	181.8	0.2	0
22	125.4	1.0	169.2	0.0	0
22	142.4	4.8	185.6	0.0	0
22	150.4	0.0	214.4	3.2	0
22	145.6	1.6	203.6	5.2	0
23	147.2	3.2	196.8	1.6	0
23	139.2	1.6	179.2	0.0	0
24	169.6	0.0	204.8	0.0	0
24	139.2	1.6	176.0	3.2	0
24	153.6	0.0	212.0	0.8	0
25	146.8	0.0	194.8	3.2	0
25	139.2	1.6	198.4	3.2	0
25	136.0	1.6	181.6	2.4	0
26	138.8	1.6	191.6	0.0	0
26	150.4	0.0	205.2	0.4	0
26	139.0	1.4	178.6	0.2	0
27	133.8	0.2	180.8	0.0	0
27	139.0	1.8	190.4	1.6	0
28	136.0	1.6	193.2	3.6	0
28	146.4	0.8	195.6	2.8	0
29	145.2	4.8	194.2	3.8	0
29	146.4	0.8	208.2	0.2	0
29	138.0	2.8	181.2	0.4	0
30	148.8	1.6	196.4	1.6	0

31	137.2	0.0	184.0	0.0	0
31	147.2	0.0	197.6	0.8	0
32	144.0	0.0	185.8	0.2	0
32	156.0	0.0	192.8	2.4	0
34	137.0	0.2	182.4	0.0	0
35	143.2	2.4	184.0	1.6	0
36	141.6	0.8	187.2	1.6	0
37	152.0	1.6	189.2	2.8	0
39	157.4	3.4	227.0	2.6	0
40	141.4	0.6	209.2	1.6	0
42	156.0	2.4	195.2	3.2	0
43	150.4	1.6	180.0	0.8	0
43	142.4	1.6	188.8	0.0	0
46	158.0	2.0	192.0	3.2	0
48	130.0	3.6	190.0	0.4	0
49	152.2	1.4	200.0	4.8	0
49	150.0	3.2	206.6	2.2	0
50	146.4	2.4	191.6	2.8	0
54	146.0	1.2	203.2	1.6	0
55	140.8	0.0	184.0	1.6	0
56	140.4	0.4	203.2	1.6	0
56	155.8	3.0	187.8	2.6	0
56	141.6	0.8	196.8	1.6	0
57	144.8	0.8	188.0	0.8	0
57	146.8	3.2	191.6	0.0	0
59	176.8	2.4	232.8	0.8	0
60	171.0	1.8	202.0	3.6	0
60	163.2	0.0	224.0	0.0	0
60	171.6	1.2	213.8	3.4	0
60	146.4	4.0	203.2	4.8	0
62	146.8	3.6	201.6	3.2	0
67	154.4	2.4	205.2	6.0	0
69	171.2	1.6	210.4	0.8	0
73	157.2	0.4	204.8	0.0	0
74	175.2	5.6	235.6	0.4	0
79	155.0	1.4	204.4	0.0	0
23	148.0	0.8	205.4	0.6	1
25	195.2	3.2	262.8	0.4	1
25	158.0	8.0	209.8	12.2	1
28	134.4	0.0	198.4	3.2	1
29	190.2	14.2	243.8	10.6	1
29	160.4	18.4	222.8	31.2	1
31	227.8	90.2	270.2	83.0	1
34	211.0	3.0	250.8	5.2	1
35	204.8	12.8	254.4	11.2	1
36	141.2	6.8	194.4	21.6	1
39	157.4	3.4	227.0	2.6	1
42	166.4	0.0	226.0	0.0	1
43	191.8	35.4	243.6	40.8	1
44	156.8	0.0	203.2	0.0	1
44	202.8	29.2	246.4	24.8	1
44	165.2	18.4	254.0	46.4	1
45	162.0	5.6	224.4	8.8	1
45	138.4	0.8	176.8	4.0	1
45	158.4	1.6	214.4	0.0	1
46	155.4	1.8	201.2	6.0	1
46	214.8	9.2	290.6	0.6	1
47	185.0	19.0	274.4	7.6	1
48	236.0	20.0	328.0	0.0	1
57	170.8	24.0	228.4	33.6	1
57	165.6	16.8	229.2	15.6	1
58	238.4	8.0	304.4	6.0	1
58	164.0	0.8	216.8	0.8	1
58	169.8	0.0	219.2	1.6	1

### Úloha B4.06 Přehled radiotherapeutického léčení u vybraných pacientů

Data: B406x1 počet symptomů jako je pálení žáhy, zvracení, atd., B406x2 objem provedených činností ve stupnici 1 až 5, B406x3 objem spánku ve stupnici 1 až 5, B406x4 množství zkonsumované stravy, B406x5 apetit ve stupnici 1 až 5, B406x6 podrážděnost kůže ve stupnici 0 až 3.

B406x1	B406x2	B406x3	B406x4	B406x5	B406x6
0.889	1.389	1.555	2.222	1.945	1
2.813	1.437	0.999	2.312	2.312	2
1.454	1.091	2.364	2.455	2.909	3
0.294	0.941	1.059	2.000	1.000	1
2.727	2.545	2.819	2.727	4.091	0
3.937	1.250	1.937	2.937	3.749	1
2.786	1.714	2.357	2.071	2.000	2
5.231	2.692	1.077	1.846	2.539	1
1.150	1.100	0.950	2.000	1.000	1
6.500	2.562	1.749	2.562	2.499	1
0.800	1.000	2.200	2.267	2.466	2
4.600	2.000	3.000	2.500	3.400	1
3.500	1.286	2.714	1.286	1.252	3
3.444	2.556	2.388	2.389	3.000	1
4.071	1.000	1.000	2.357	1.572	1
3.692	1.000	2.538	2.154	2.615	1
5.167	3.000	1.000	2.667	3.666	0
0.500	1.000	1.000	2.000	1.000	0
2.385	1.923	2.539	2.154	2.461	1
2.100	1.300	1.300	1.800	2.600	1
5.000	3.250	3.125	2.375	3.375	0
4.571	1.214	3.286	2.571	3.572	1
2.733	1.133	2.600	1.933	1.667	1
4.235	2.294	2.706	2.176	1.883	1
0.000	1.000	1.941	2.000	2.000	0
0.750	1.125	3.000	1.875	2.000	3
3.077	1.462	2.384	2.000	1.846	2
1.600	1.200	2.950	2.000	2.750	1
6.273	3.636	1.182	2.545	3.364	0
2.625	1.000	2.438	1.937	2.062	2
1.250	1.000	2.000	2.000	3.000	1
2.437	2.062	1.687	1.875	1.375	1
4.454	1.727	2.637	2.636	3.546	1
0.133	1.000	1.000	2.000	1.000	0
0.222	1.222	1.445	2.000	1.000	1
2.467	2.667	2.200	1.933	1.800	3
4.000	1.000	4.000	2.167	2.500	0
5.385	3.154	2.384	2.846	2.539	1
0.773	1.000	2.273	1.909	2.091	0
3.786	2.000	1.571	1.786	1.285	3
1.923	1.615	1.693	2.000	1.846	1
1.000	1.333	1.834	2.000	1.917	1
5.800	2.600	3.000	2.800	4.200	1
6.062	1.000	1.562	2.375	1.750	0
3.706	1.235	1.530	2.118	2.294	1
2.444	2.333	1.223	2.444	1.776	3
6.111	2.222	2.889	2.889	3.555	2
2.533	1.067	1.600	2.000	1.333	1
2.167	1.000	2.167	2.000	2.500	1
2.375	1.062	2.375	2.000	2.125	3
1.875	1.312	2.188	2.125	2.062	2
1.750	1.333	1.167	1.750	1.000	1
7.333	1.333	1.459	1.958	1.542	3
5.250	1.375	2.812	2.125	2.563	3
5.182	2.000	2.727	2.818	4.000	2
1.875	2.000	2.250	2.813	2.437	2
5.400	2.000	1.200	1.800	1.400	2
1.154	1.000	1.923	1.846	2.462	1

6.375	2.250	2.500	2.125	3.000	1
9.454	2.727	3.818	2.455	3.272	3
1.000	1.000	1.917	1.833	2.167	1
1.444	1.111	2.000	2.111	2.000	1
1.800	1.100	3.100	2.200	2.600	1
2.818	2.000	1.955	2.045	2.546	2
10.461	2.154	2.769	2.000	2.923	0
4.143	1.929	2.642	2.429	3.142	3
1.227	1.182	1.091	2.227	3.182	1
5.667	3.000	1.667	2.667	5.000	1
4.111	2.556	2.222	2.778	3.778	1
4.444	1.667	2.222	2.000	2.444	0
3.714	3.857	2.643	2.286	3.285	0
7.400	3.700	3.100	2.500	4.200	1
3.182	2.455	1.636	2.273	3.000	1
5.200	2.600	0.800	1.800	2.000	0
2.333	1.667	0.666	1.667	2.166	0
3.333	1.917	2.083	1.917	3.000	1
5.250	2.750	2.500	2.000	4.000	0
7.714	4.000	3.071	2.929	4.428	3
3.846	2.615	3.000	2.692	3.693	2
2.444	1.111	1.000	2.111	1.667	2
5.333	1.917	3.000	2.250	1.917	1
1.556	1.778	3.444	2.667	3.333	1
3.182	1.545	1.910	2.273	3.000	1
6.222	2.444	3.689	2.444	3.445	1
7.231	1.000	3.154	2.308	4.384	2
3.857	1.071	3.000	2.071	2.286	1
3.778	1.944	1.612	1.611	1.945	1
6.000	1.400	2.067	2.267	2.866	2
2.333	3.583	2.334	2.333	2.667	2
7.571	2.143	3.143	2.571	3.929	1
3.667	2.000	2.111	2.778	4.000	3
3.600	2.933	2.067	2.200	2.867	0
3.364	1.273	1.810	2.000	2.273	0
4.100	1.900	2.800	2.000	2.600	2
0.125	1.062	1.437	1.875	1.563	0
6.231	2.769	1.462	2.385	4.000	2
3.000	1.455	2.090	2.273	3.272	2
0.889	1.000	1.000	2.000	1.000	2

#### Úloha B4.07 Úbytek kostní hmoty starších žen po cvičeních a dietách (EDA, CORA,

Data: B407x1 poloměr u dominantní kosti, B407x2 poloměr u vedlejší kosti, B407x3 dominantní část kosti pažní, B407x4 vedlejší část kosti pažní, B407x5 dominantní část kosti loketní, B407x6 vedlejší část kosti loketní.

B407x1	B407x2	B407x3	B407x4	B407x5	B407x6
1.103	1.052	2.139	2.238	0.873	0.872
0.842	0.859	1.873	1.741	0.590	0.744
0.925	0.873	1.887	1.809	0.767	0.713
0.857	0.744	1.739	1.547	0.706	0.674
0.795	0.809	1.734	1.715	0.549	0.654
0.787	0.779	1.509	1.474	0.782	0.571
0.933	0.880	1.695	1.656	0.737	0.803
0.799	0.851	1.740	1.777	0.618	0.682
0.945	0.876	1.811	1.759	0.853	0.777
0.921	0.906	1.954	2.009	0.823	0.765
0.792	0.825	1.624	1.657	0.686	0.668
0.815	0.751	2.204	1.846	0.678	0.546
0.755	0.724	1.508	1.458	0.662	0.595
0.880	0.866	1.786	1.811	0.810	0.819
0.900	0.838	1.902	1.606	0.723	0.677
0.764	0.757	1.743	1.794	0.586	0.541
0.733	0.748	1.863	1.869	0.672	0.752
0.932	0.898	2.028	2.032	0.836	0.805
0.856	0.786	1.390	1.324	0.578	0.610

0.890	0.950	2.187	2.087	0.758	0.718
0.688	0.532	1.650	1.378	0.533	0.482
0.940	0.850	2.334	2.225	0.757	0.731
0.493	0.616	1.037	1.268	0.546	0.615
0.835	0.752	1.509	1.422	0.618	0.664
0.915	0.936	1.971	1.869	0.869	0.868

**Úloha B4.08 Významnost rozdílů a struktura funkce plic při velké zátěži u mužů a žen**

Data: B408x1 zbývající objem kyslíku [kg/min], B408x2 zbývající objem kyslíku [ml/kg/min], B408x3 maximální objem kyslíku [kg/min], B408x4 maximální objem kyslíku [ml/kg/min], B408x5 pohlaví.

B408x1	B408x2	B408x3	B408x4	B408x5
0.34	3.71	2.87	30.87	male
0.39	5.08	3.38	43.85	male
0.48	5.13	4.13	44.51	male
0.31	3.95	3.60	46.00	male
0.36	5.51	3.11	47.02	male
0.33	4.07	3.95	48.50	male
0.43	4.77	4.39	48.75	male
0.48	6.69	3.50	48.86	male
0.21	3.71	2.82	48.92	male
0.32	4.35	3.59	48.38	male
0.54	7.89	3.47	50.56	male
0.32	5.37	3.07	51.15	male
0.40	4.95	4.43	55.34	male
0.31	4.97	3.56	56.67	male
0.44	6.68	3.86	58.49	male
0.32	4.80	3.31	49.99	male
0.50	6.43	3.29	42.25	male
0.36	5.99	3.10	51.70	male
0.48	6.30	4.80	63.30	male
0.40	6.00	3.06	46.23	male
0.42	6.04	3.85	55.08	male
0.55	6.45	5.00	58.80	male
0.50	5.55	5.23	57.46	male
0.34	4.27	4.00	50.35	male
0.40	4.58	2.82	32.48	male
0.29	5.04	1.93	33.85	female
0.28	3.95	2.51	35.82	female
0.31	4.88	2.31	36.40	female
0.30	5.97	1.90	37.87	female
0.28	4.57	2.32	38.30	female
0.11	1.74	2.49	39.19	female
0.25	4.66	2.12	39.21	female
0.26	5.28	1.98	39.94	female
0.39	7.32	2.25	42.41	female
0.37	6.22	1.71	28.97	female
0.31	4.20	2.76	37.80	female
0.35	5.10	2.10	31.10	female
0.29	4.46	2.50	38.30	female
0.33	5.60	3.06	51.80	female
0.18	2.80	2.40	37.60	female
0.28	4.01	2.58	36.78	female
0.44	6.69	3.05	46.16	female
0.22	4.55	1.85	38.95	female
0.34	5.73	2.43	40.60	female
0.30	5.12	2.58	43.69	female
0.31	4.77	1.97	30.40	female
0.27	5.16	2.03	39.46	female
0.66	11.05	2.32	39.34	female
0.37	5.23	2.48	34.86	female
0.35	5.37	2.25	35.07	female

**Úloha B4.09 Sledování pocení u zdravých žen**

Data: B409x1 nasládllost, B409x2 obsah sodíku, B409x3 obsah draslíku.

<i>B409x1</i>	<i>B409x2</i>	<i>B409x3</i>
3.70	48.50	9.30
5.70	65.10	8.00
3.80	47.20	10.90
3.20	53.20	12.00
3.10	55.50	9.70
4.60	36.10	7.90
2.40	24.80	14.00
7.20	33.10	7.60
6.70	47.40	8.50
5.40	54.10	11.30
3.90	36.90	12.70
4.50	58.80	12.30
3.50	27.80	9.80
4.50	40.20	8.40
1.50	13.50	10.10
8.50	56.40	7.10
4.50	71.60	8.20
6.50	52.80	10.90
4.10	44.10	11.20
5.50	40.90	9.40

**Úloha B4.10** Korelace výšek a stáří muže a ženy u 169 manželských dvojic (CORA)

*Data:* *B410x1* věk manžela [roky], *B410x2* výška manžela [mm], *B410x3* věk manželky [roky], *B410x4* výška manželky [mm] a *B410x5* věk manžela při první svatbě [roky].

<i>B410x1</i>	<i>B410x2</i>	<i>B410x3</i>	<i>B410x4</i>	<i>B410x5</i>
49	1809	43	1590	25
25	1841	28	1560	19
40	1659	30	1620	38
52	1779	57	1540	26
58	1616	52	1420	30
32	1695	27	1660	23
43	1730	52	1610	33
47	1740	43	1580	26
31	1685	23	1610	26
26	1735	25	1590	23
40	1713	39	1610	23
35	1736	32	1700	31
35	1799	35	1680	19
35	1785	33	1680	24
47	1758	43	1630	24
38	1729	35	1570	27
33	1720	32	1720	28
32	1810	30	1740	22
38	1725	40	1600	31
29	1683	29	1600	25
59	1585	55	1550	23
26	1684	25	1540	18
50	1674	45	1640	25
49	1724	44	1640	27
42	1630	40	1630	28
33	1855	31	1560	22
27	1700	25	1580	21
57	1765	51	1570	32
34	1700	31	1590	28
28	1721	25	1650	23
37	1829	35	1670	22
56	1710	55	1600	44
27	1745	23	1610	25
36	1698	35	1610	22
31	1853	28	1670	20
57	1610	52	1510	25
55	1680	53	1520	21
47	1809	43	1620	25



64	1580	61	1530	21
31	1585	23	1570	28
35	1705	35	1580	25
36	1675	35	1590	22
40	1735	39	1670	23
30	1686	24	1630	27
32	1768	29	1510	21
20	1754	21	1660	19
45	1739	39	1610	25
59	1699	52	1440	27
43	1825	52	1570	25
29	1740	26	1670	24
47	1731	48	1730	21
43	1755	42	1590	20
54	1713	50	1600	23
61	1723	64	1490	26
27	1783	26	1660	20
27	1749	32	1580	24
32	1710	31	1500	31
54	1724	53	1640	20
37	1620	39	1650	21
55	1764	45	1620	29
36	1791	33	1550	30
32	1795	32	1640	25
57	1738	55	1560	24
51	1666	52	1570	24
50	1745	50	1550	22
32	1775	32	1600	20
54	1669	54	1660	20
34	1700	32	1640	22
45	1804	41	1670	27
64	1700	61	1560	24
55	1664	43	1760	31
27	1753	28	1640	23
55	1788	51	1600	26
41	1680	41	1550	22
44	1715	41	1570	24
22	1755	21	1590	21
30	1764	28	1650	29
53	1793	47	1690	31
42	1731	37	1580	23
31	1713	28	1590	28
36	1725	35	1510	26
56	1828	55	1600	30
46	1735	45	1660	22
34	1760	34	1700	23
55	1685	51	1530	34
44	1685	39	1490	27
45	1559	35	1580	34
48	1705	45	1500	28
44	1723	44	1600	41
59	1700	47	1570	39
64	1660	57	1620	32
34	1681	33	1410	22
37	1803	38	1560	23
54	1866	59	1590	49
49	1884	46	1710	25
63	1705	60	1580	27
48	1780	47	1690	22
64	1801	55	1610	37
33	1795	45	1660	17
52	1669	47	1610	23
27	1708	24	1590	26
33	1691	32	1530	21

46	1825	47	1690	23
54	1760	57	1600	23
54	1905	46	1670	32
49	1739	42	1600	28
62	1736	63	1570	22
34	1845	32	1700	24
23	1868	24	1740	19
36	1765	32	1540	27
59	1720	56	1530	24
53	1871	50	1690	25
55	1720	55	1590	21
62	1629	58	1610	23
42	1624	38	1670	22
50	1653	44	1690	35
37	1786	35	1550	21
51	1620	44	1650	30
25	1695	25	1540	19
54	1674	43	1660	35
34	1864	31	1620	23
43	1643	35	1630	29
43	1705	41	1610	22
58	1736	50	1540	32
28	1691	23	1610	23
45	1753	43	1630	21
47	1680	49	1530	20
57	1724	59	1520	24
34	1638	38	1570	33
57	1725	42	1580	52
27	1725	21	1550	24
48	1774	42	1580	30
37	1771	35	1630	28
25	1815	26	1650	20
57	1575	57	1640	20
40	1729	34	1650	26
61	1749	63	1520	21
25	1705	23	1620	24
24	1774	23	1680	22
47	1658	46	1670	24
44	1790	40	1620	24
52	1798	53	1570	25
45	1824	40	1660	23
20	1796	22	1550	19
60	1725	60	1590	21
36	1685	32	1620	25
25	1769	24	1560	18
25	1749	28	1670	21
35	1716	40	1650	17
49	1773	48	1470	21
33	1760	33	1580	20
50	1725	49	1670	23
63	1645	64	1520	28
57	1694	55	1620	24
41	1851	41	1710	23
38	1691	38	1530	20
30	1880	31	1630	22
52	1835	52	1720	30
51	1730	43	1570	22
46	1644	51	1560	27
50	1723	47	1650	25
52	1718	32	1590	25
30	1723	33	1590	22
20	1786	18	1590	19
51	1675	45	1550	25
64	1641	64	1570	30

44	1743	43	1560	25
40	1823	39	1630	23
59	1720	56	1530	24

**Úloha B4.11** Korelace počtů narozených a zemřelých v populaci 69 států

Data: *B411i* název státu, *B411x1* promile narozených, tj. počet na 1000 obyvatel, *B411x2* promile zemřelých.

	<i>B411i</i>	<i>B411x1</i>	<i>B411x2</i>
alg		36.4	14.6
con		37.3	8.0
egy		42.1	15.3
gha		55.8	25.6
ict		56.1	33.1
mag		41.8	15.8
mor		46.1	18.7
tun		41.7	10.1
cam		41.4	19.7
cey		35.8	8.5
chi		34.0	11.0
tai		36.3	6.1
hkg		32.1	5.5
ind		20.9	8.8
ids		27.7	10.2
irq		20.5	3.9
isr		25.0	6.2
jap		17.3	7.0
jor		46.3	6.4
kor		14.8	5.7
mal		33.5	6.4
mog		39.2	11.2
phl		28.4	7.1
syr		26.2	4.3
tha		34.8	7.9
vit		23.4	5.1
can		24.8	7.8
cra		49.9	8.5
dmr		33.0	8.4
gut		47.7	17.3
hon		46.6	9.7
mex		45.1	10.5
nic		42.9	7.1
pan		40.1	8.0
usa		21.7	9.6
arg		21.8	8.1
bol		17.4	5.8
bra		45.0	13.5
chl		33.6	11.8
clo		44.0	11.7
ecu		44.2	13.5
per		27.7	8.2
urg		22.5	7.8
ven		42.8	6.7
aus		18.8	12.8
bel		17.1	12.7
brt		18.2	12.2
bul		16.4	8.2
cze		16.9	9.5
dem		17.6	19.8
fin		18.1	9.2
fra		18.2	11.7
gmy		18.0	12.5
gre		17.4	7.8
hun		13.1	9.9
irl		22.3	11.9
ity		19.0	10.2

net	20.9	8.0
now	17.5	10.0
pol	19.0	7.5
pog	23.5	10.8
rom	15.7	8.3
spa	21.5	9.1
swe	14.8	10.1
swz	18.9	9.6
rus	21.2	7.2
yug	21.4	8.9
ast	21.6	8.7
nzl	25.5	8.8

#### Úloha B4.12 Aplikace logistické diskriminační analýzy u rakoviny prostaty (LDA)

Data:  $B412i$  index pacienta,  $B412x1$  věk pacienta,  $B412x2$  hladina sérové kyselý fosfatázy v King-Armstrongových jednotkách,  $B412x3$  výsledek roentgenového vyšetření (=0, negativní, =1 pozitivní),  $B412x4$  velikost tumoru rektálním vyšetřením (=0 malý, =1 velký),  $B412x5$  závěr patologického bodování z biopsie (=0 méně vážný, =1 velmi vážný),  $B412x6$  výsledek laparotomického vyšetření (=0 absence, =1 přítomnost nodálního rozšíření).

$B412i$	$B412x1$	$B412x2$	$B412x3$	$B412x4$	$B412x5$	$B412x6$
1	66	0.480	0	0	0	0
2	68	0.560	0	0	0	0
3	66	0.500	0	0	0	0
4	56	0.520	0	0	0	0
5	58	0.500	0	0	0	0
6	60	0.490	0	0	0	0
7	65	0.460	1	0	0	0
8	60	0.620	1	0	0	0
9	50	0.560	0	0	1	1
10	49	0.550	1	0	0	0
11	61	0.620	0	0	0	0
12	58	0.710	0	0	0	0
13	51	0.650	0	0	0	0
14	67	0.670	1	0	1	0
15	67	0.470	0	0	1	0
16	51	0.490	0	0	0	0
17	56	0.500	0	0	1	0
18	60	0.780	0	0	0	0
19	52	0.830	0	0	0	0
20	56	0.980	0	0	0	0
21	67	0.520	0	0	0	0
22	63	0.750	0	0	0	0
23	59	0.990	0	0	1	1
24	64	1.870	0	0	0	0
25	61	1.360	1	0	0	1
26	56	0.820	0	0	0	1
27	64	0.400	0	1	1	0
28	61	0.500	0	1	0	0
29	64	0.500	0	1	1	0
30	63	0.400	0	1	0	0
31	52	0.550	0	1	1	0
32	66	0.590	0	1	1	0
33	58	0.480	1	1	0	1
34	57	0.510	1	1	1	1
35	65	0.490	0	1	0	1
36	65	0.480	0	1	1	0
37	59	0.630	1	1	1	0
38	61	1.020	0	1	0	0
39	53	0.760	0	1	0	0
40	67	0.950	0	1	0	0
41	53	0.660	0	1	1	0
42	65	0.840	1	1	1	1
43	50	0.810	1	1	1	1
44	60	0.760	1	1	1	1
45	45	0.700	0	1	1	1

46	56	0.780	1	1	1	1
47	46	0.700	0	1	0	1
48	67	0.670	0	1	0	1
49	63	0.820	0	1	0	1
50	57	0.670	0	1	1	1
51	51	0.720	1	1	0	1
52	64	0.890	1	1	0	1
53	68	1.260	1	1	1	1

**Úloha B4.13** Porovnání účinnosti léčení Alzheimerovy nemoci lecithinem nebo placebem (EDA, CORA, PCA)

Data: B413x1 značí placebo (=1) nebo lecithin (=2), B413x2 počet slov opakovaný pacientem ze standardní testovací předlohy, B413x3 totéž po 2. měsíci, B413x4 totéž po 3. měsíci, B413x5 totéž po 4. měsíci, B413x6 totéž po 5. měsíci.

B413x1	B413x2	B413x3	B413x4	B413x5	B413x6
1	20	15	14	13	13
1	14	12	12	10	10
1	7	5	5	6	5
1	6	10	9	8	7
1	9	7	9	5	4
1	9	9	9	11	8
1	7	3	7	6	5
1	18	17	16	14	12
1	6	9	9	9	9
1	10	15	12	12	11
1	5	9	7	3	5
1	11	11	8	8	9
1	10	2	9	3	5
1	17	12	14	10	9
1	16	15	12	7	9
1	7	10	4	7	5
1	5	0	5	0	0
1	16	7	7	6	4
1	2	1	1	2	2
1	7	11	7	5	8
1	9	16	14	10	6
1	2	5	6	7	6
1	7	3	5	5	5
1	19	13	14	12	10
1	7	5	8	8	6
2	9	12	16	17	18
2	6	7	10	15	16
2	13	18	14	21	21
2	9	10	12	14	15
2	6	7	8	9	12
2	11	11	12	14	16
2	7	10	11	12	14
2	8	18	19	19	22
2	3	3	3	7	8
2	4	10	11	17	18
2	11	10	10	15	16
2	1	3	2	4	5
2	6	7	7	9	10
2	0	3	3	4	6
2	18	18	19	22	22
2	15	15	15	18	19
2	10	14	16	17	19
2	6	6	7	9	10
2	9	9	13	16	20
2	4	3	4	7	9
2	4	13	13	16	19
2	10	11	13	17	21

**Úloha B4.14** Aglomerativní hierarchické shlukování při analýze lebek Tibeťanů (EDA, PCA, CLU)

Data: B414x1 největší délka lebky [mm], B414x2 největší horizontální šířka lebky [mm], B414x3 výška lebky [mm], B414x4 výška horní části obličeje [mm], B414x5 šířka obličeje mezi body lících kostí [mm].

<i>B414x1</i>	<i>B414x2</i>	<i>B414x3</i>	<i>B414x4</i>	<i>B414x5</i>
190.5	152.5	145.0	73.5	136.5
172.5	132.0	125.5	63.0	121.0
167.0	130.0	125.5	69.5	119.5
169.5	150.5	133.5	64.5	128.0
175.0	138.5	126.0	77.5	135.5
177.5	142.5	142.5	71.5	131.0
179.5	142.5	127.5	70.5	134.5
179.5	138.0	133.5	73.5	132.5
173.5	135.5	130.5	70.0	133.5
162.5	139.0	131.0	62.0	126.0
178.5	135.0	136.0	71.0	124.0
171.5	148.5	132.5	65.0	146.5
180.5	139.0	132.0	74.5	134.5
183.0	149.0	121.5	76.5	142.0
169.5	130.0	131.0	68.0	119.0
172.0	140.0	136.0	70.5	133.5
170.0	126.5	134.5	66.0	118.5
182.5	136.0	138.5	76.0	134.0
179.5	135.0	128.5	74.0	132.0
191.0	140.5	140.5	72.5	131.5
184.5	141.5	134.5	76.5	141.5
181.0	142.0	132.5	79.0	136.5
173.5	136.5	126.0	71.5	136.5
188.5	130.0	143.0	79.5	136.0
175.0	153.0	130.0	76.5	142.0
196.0	142.5	123.5	76.0	134.0
200.0	139.5	143.5	82.5	146.0
185.0	134.5	140.0	81.5	137.0
174.5	143.5	132.5	74.0	136.5
195.5	144.0	138.5	78.5	144.0
197.0	131.5	135.0	80.5	139.0
182.5	131.0	135.0	68.5	136.0

**Úloha B4.15** Vícenásobná korespondenční analýza ušních infekcí plavců (CCA)

Data:  $B_{415 \times 1}$  značí častý plavec v moři (=1 ano, =2 ne),  $B_{415 \times 2}$  značí plážový plavec (=1 ne, =4 ano),  $B_{415 \times 3}$  je věková kategorie (=2 je 15-19 let, =3 je 20-25 let, =4 je 26-29 let),  $B_{415 \times 4}$  značí pohlaví (=1 muž, =2 žena),  $B_{415 \times 5}$  značí počet samodiagnostikovaných ušních infekcí, které plavec oznámil.

$B_{415 \times 1}$	$B_{415 \times 2}$	$B_{415 \times 3}$	$B_{415 \times 4}$	$B_{415 \times 5}$
1	1	2	1	0
1	1	2	1	0
1	1	2	1	0
1	1	2	1	0
1	1	2	1	0
1	1	2	1	0
1	1	2	1	0
1	1	2	1	0
1	1	2	1	0
1	1	2	1	0
1	1	2	1	0
1	1	2	1	1
1	1	2	1	1
1	1	2	1	1
1	1	2	1	1
1	1	2	1	1
1	1	2	1	1
1	1	2	1	1
1	1	2	1	1
1	1	2	1	1
1	1	2	1	1
1	1	2	1	2
1	1	2	1	2
1	1	2	1	2
1	1	2	1	2
1	1	2	1	2
1	1	2	1	3
1	1	2	1	3
1	1	2	1	3
1	1	2	1	3
1	1	2	1	4
1	1	2	1	4
1	1	2	1	6
1	1	2	1	11
1	1	2	1	16
1	1	2	2	0
1	1	2	2	0
1	1	2	2	4
1	1	2	2	10
1	1	3	1	0
1	1	3	1	0
1	1	3	1	0
1	1	3	1	0
1	1	3	1	1
1	1	3	1	2
1	1	3	1	2
1	1	3	1	2
1	1	3	1	3
1	1	3	1	3
1	1	3	1	5
1	1	3	1	17
1	1	3	2	0
1	1	3	2	0
1	1	3	2	0
1	1	3	2	0
1	1	3	2	1
1	1	3	2	2
1	1	3	2	3
1	1	3	2	3
1	1	3	2	4
1	1	4	1	1









2	4	3	1	0
2	4	3	1	0
2	4	3	1	1
2	4	3	1	1
2	4	3	1	5
2	4	3	2	0
2	4	3	2	0
2	4	3	2	0
2	4	3	2	0
2	4	3	2	0
2	4	3	2	0
2	4	3	2	1
2	4	3	2	1
2	4	3	2	1
2	4	3	2	2
2	4	4	1	0
2	4	4	1	0
2	4	4	1	0
2	4	4	1	0
2	4	4	1	0
2	4	4	1	0
2	4	4	1	0
2	4	4	1	0
2	4	4	1	0
2	4	4	1	0
2	4	4	1	0
2	4	4	1	0
2	4	4	1	1
2	4	4	1	2
2	4	4	1	2
2	4	4	2	0
2	4	4	2	0
2	4	4	2	0
2	4	4	2	2
2	4	4	2	2
2	4	4	2	2
2	4	4	2	2

#### Úloha B4.16 Faktorová analýza ordinálních proměnných na 29 pacientkách (FACT, PCA, CLU)

Data: B416i index pacienta, B416x1 věk, B416x2 IQ, B416x3 úzkost (=1 značí žádnou, =2 mírnou, =3 střední, =4 silnou), B416x4 je skleslost (=1 značí žádnou, =2 mírnou, =3 střední, =4 silnou), B416x5 značí kvalitu spaní (=1 dobrá, =2 nespavost), B416x6 značí zájem o sex (=1 ne, =2 ano), B416x7 značí myšlenky na sebevraždu (=1 ne, =2 ano), B416x8 parametr weight, -99 značí chybějící hodnotu.

B416i	B416x1	B416x2	B416x3	B416x4	B416x5	B416x6	B416x7	B416x8
1	39	94	2	2	2	2	2	4.9
2	41	89	2	2	2	2	2	2.2
3	42	83	3	3	3	2	2	4
4	30	99	2	2	2	2	2	-2.6
5	35	94	2	1	1	2	1	-0.3
6	44	90	-99	1	2	1	1	0.9
7	31	94	2	2	-99	2	2	-1.5
8	39	87	3	2	2	2	1	3.5
9	35	-99	3	2	2	2	2	-1.2
10	33	92	2	2	2	2	2	0.8
11	38	92	2	1	1	1	1	-1.9
12	31	94	2	2	2	-99	1	5.5
13	40	91	3	2	2	2	1	2.7
14	44	86	2	2	2	2	2	4.4
15	43	90	3	2	2	2	2	3.2
16	32	-99	1	1	1	2	1	-1.5
17	32	91	1	2	2	-99	1	-1.9
18	43	82	4	3	2	2	2	8.3
19	46	86	3	2	2	2	2	3.6
20	30	88	2	2	2	2	1	1.4
21	34	97	3	3	-99	2	2	-99
22	37	96	3	2	2	2	1	-99

23	35	95	2	1	2	2	1	-1
24	45	87	2	2	2	2	2	6.5
25	35	103	2	2	2	2	1	-2.1
26	31	-99	2	2	2	2	1	-0.4
27	32	91	2	2	2	2	1	-1.9
28	44	87	2	2	2	2	2	3.7
29	40	91	3	3	2	2	2	4.5
30	42	89	3	3	2	2	2	4.2
31	36	92	3	-99	2	2	2	-99
32	42	84	3	3	2	2	2	1.7
33	46	94	2	-99	2	2	2	4.8
34	41	92	2	1	2	2	1	1.7
35	30	96	-99	2	2	2	2	-3
36	39	96	2	2	2	1	1	0.8
37	40	86	2	3	2	2	2	1.5
38	42	92	3	2	2	2	1	1.3
39	35	102	2	2	2	2	2	3
40	31	82	2	2	2	2	1	1
41	33	92	3	3	2	2	2	1.5
42	43	90	-99	-99	2	2	2	3.4
43	37	92	2	1	1	1	1	-99
44	32	88	4	2	2	2	1	-99
45	34	98	2	2	2	2	-99	0.6
46	34	93	3	2	2	2	2	0.6
47	42	90	2	1	1	2	1	3.3
48	41	91	2	1	1	1	1	4.8
49	31	-99	3	1	2	2	1	-2.2
50	32	92	3	2	2	2	2	1
51	29	92	2	2	2	1	2	-1.2
52	41	91	2	2	2	2	2	4
53	39	91	2	2	2	2	2	5.9
54	41	86	2	1	1	2	1	0.2
55	34	95	2	1	1	2	1	3.5
56	39	91	1	1	2	1	1	2.9
57	35	96	3	2	2	1	1	-0.6
58	31	100	2	2	2	2	2	-0.6
59	32	99	4	3	2	2	2	-2.5
60	41	89	2	1	2	1	1	3.2
61	41	89	3	2	2	2	2	2.1
62	44	98	3	2	2	2	2	3.8
63	35	98	2	2	2	2	1	-2.4
64	41	103	2	2	2	2	2	-0.8
65	41	91	3	1	2	2	1	5.8
66	42	91	4	3	-99	-99	2	2.5
67	33	94	2	2	2	2	1	-1.8
68	41	91	2	1	2	2	1	4.3
69	43	85	2	2	2	1	1	-99
70	37	92	1	1	2	2	1	1
71	36	96	3	3	2	2	2	3.5
72	44	90	2	-99	2	2	2	3.3
73	42	87	2	2	2	1	2	-0.7
74	31	95	2	3	2	2	2	-1.6
75	29	95	3	3	2	2	2	-0.2
76	32	87	1	1	2	2	1	-3.7
77	35	95	2	2	2	2	2	3.8
78	42	88	1	1	1	2	1	-1
79	32	94	2	2	2	2	1	4.7
80	39	-99	3	2	2	2	2	-4.9
81	34	-99	3	-99	2	2	1	-99
82	34	87	3	3	2	2	1	2.2
83	42	92	1	1	2	1	1	5
84	43	86	2	3	2	2	2	0.4
85	31	93	-99	2	2	2	2	-4.2
86	31	92	2	2	2	2	1	-1.1

87	36	106	2	2	2	1	2	-1
88	37	93	2	2	2	2	2	4.2
89	43	95	2	2	2	2	1	2.4
90	32	95	3	2	2	2	2	4.9
91	32	92	-99	-99	-99	2	2	3
92	32	98	2	2	2	2	2	-0.3
93	43	92	2	2	2	2	2	1.2
94	41	88	2	2	2	2	1	2.6
95	43	85	1	1	2	2	1	1.9
96	39	92	2	2	2	2	1	3.5
97	41	84	2	2	2	2	2	-0.6
98	41	92	2	1	2	2	1	1.4
99	32	91	2	2	2	2	2	5.7
100	44	86	3	2	2	2	2	4.6
101	42	92	3	2	2	2	1	-99
102	39	89	2	2	2	2	1	2
103	45	-99	2	2	2	2	2	0.6
104	39	96	3	-99	2	2	2	-99
105	31	97	2	-99	-99	-99	2	2.8
106	34	92	3	2	2	2	2	-2.1
107	41	92	2	2	2	2	2	-2.5
108	33	98	3	2	2	2	2	2.5
109	34	91	2	1	1	2	1	5.7
100	42	91	3	3	2	2	2	2.4
111	40	89	3	1	1	1	1	1.5
112	35	94	3	3	2	2	2	1.7
113	41	90	3	2	2	2	2	2.5
114	32	96	2	1	1	2	1	-99
115	39	87	2	2	2	1	2	-99
116	41	86	3	2	1	1	2	-1
117	33	89	1	1	1	1	1	6.5
118	42	-99	3	2	2	2	2	4.9

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### Úloha B4.17 Vícerozměrné škálování u analýzy příbuznosti 14 emocí (MDS)

Data: prvky trojúhelníkové matice vyjadřují vzdálenosti (nepodobnosti, dissimilarities) objektů dvojice emocí: *x1* značí *B417x1* a znamená spokojený, *B417x2* vzrušující, *B417x3* překvapený, *B417x4* horlivý, *B417x5* šťastný, *B417x6* vášnivý, *B417x7* něžný, *B417x8* pohrdá, *B417x9* vylekaný, *B417x10* bázlivý, *B417x11* provinilý, *B417x12* smutný, *B417x13* zlostný, *B417x14* odmítnutý. Horní polovina na diagonálou se týká první osoby, dolní polovina pod diagonálou pak druhé osoby.

	<i>B417x1</i>	<i>B417x2</i>	<i>B417x3</i>	<i>B417x4</i>	<i>B417x5</i>	<i>B417x6</i>	<i>B417x7</i>	<i>B417x8</i>	<i>B417x9</i>	<i>B417x10</i>	<i>B417x11</i>	<i>B417x12</i>	<i>B417x13</i>	<i>B417x14</i>
<i>B417x1</i>	-	3	4	6	1	2	3	9	8	9	8	8	8	9
<i>B417x2</i>	7	-	5	2	3	4	2	9	9	8	7	7	8	9
<i>B417x3</i>	7	7	-	5	3	5	5	7	3	7	7	5	6	7
<i>B417x4</i>	9	4	9	-	6	1	2	7	9	6	9	6	7	7
<i>B417x5</i>	1	3	6	9	-	2	4	9	8	9	7	9	9	8
<i>B417x6</i>	3	3	4	2	1	-	2	1	5	8	6	5	2	8
<i>B417x7</i>	6	2	9	6	7	1	-	9	7	8	7	7	9	9
<i>B417x8</i>	9	7	8	9	9	3	9	-	5	4	4	3	2	2
<i>B417x9</i>	9	6	4	2	9	6	6	9	-	3	6	4	3	5
<i>B417x10</i>	9	6	3	9	9	3	9	4	1	-	3	4	3	5
<i>B417x11</i>	9	9	9	9	9	3	9	9	2	4	-	4	4	4
<i>B417x12</i>	9	7	3	8	9	3	6	9	2	2	4	-	2	2
<i>B417x13</i>	9	9	7	6	9	1	5	2	4	3	9	6	-	2
<i>B417x14</i>	9	9	7	9	9	9	9	9	2	1	4	1	3	-

### Úloha B4.18 Sledování spotřeby proteinů v Evropě (EDA, PCA, FACT, CLU)

Data: *B418i* značí index, *B418j* název země, *B418x1* červené maso, *B418x2* bílé maso, *B418x3* vejce, *B418x4* mléko, *B418x5* ryby, *B418x6* obilniny, *B418x7* škrob, *B418x8* ořechy, *B418x9* ovoce a zelenina.

<i>B418i</i>	<i>B418j</i>	<i>B418x1</i>	<i>B418x2</i>	<i>B418x3</i>	<i>B418x4</i>	<i>B418x5</i>	<i>B418x6</i>	<i>B418x7</i>	<i>B418x8</i>	<i>B418x9</i>
1	Albania	10.1	1.4	0.5	8.9	0.2	42.3	0.6	5.5	1.7
2	Austria	8.9	14.0	4.3	19.9	2.1	28.0	3.6	1.3	4.3
3	Belgium	13.5	9.3	4.1	17.5	4.5	26.6	5.7	2.1	4.0
4	Bulgaria	7.8	6.0	1.6	8.3	1.2	56.7	1.1	3.7	4.2
5	Czechoslovakia	9.7	11.4	2.8	12.5	2.0	34.3	5.0	1.1	4.0
6	Denmark	10.6	10.8	3.7	25.0	9.9	21.9	4.8	0.7	2.4
7	E Germany	8.4	11.6	3.7	11.1	5.4	24.6	6.5	0.8	3.6
8	Finland	9.5	4.9	2.7	33.7	5.8	26.3	5.1	1.0	1.4
9	France	18.0	9.9	3.3	19.5	5.7	28.1	4.8	2.4	6.5
10	Greece	10.2	3.0	2.8	17.6	5.9	41.7	2.2	7.8	6.5
11	Hungary	5.3	12.4	2.9	9.7	0.3	40.1	4.0	5.4	4.2
12	Ireland	13.9	10.0	4.7	25.8	2.2	24.0	6.2	1.6	2.9
13	Italy	9.0	5.1	2.9	13.7	3.4	36.8	2.1	4.3	6.7
14	Netherlands	9.5	13.6	3.6	23.4	2.5	22.4	4.2	1.8	3.7
15	Norway	9.4	4.7	2.7	23.3	9.7	23.0	4.6	1.6	2.7
16	Poland	6.9	10.2	2.7	19.3	3.0	36.1	5.9	2.0	6.6
17	Portugal	6.2	3.7	1.1	4.9	14.2	27.0	5.9	4.7	7.9
18	Romania	6.2	6.3	1.5	11.1	1.0	49.6	3.1	5.3	2.8
19	Spain	7.1	3.4	3.1	8.6	7.0	29.2	5.7	5.9	7.2
20	Sweden	9.9	7.8	3.5	24.7	7.5	19.5	3.7	1.4	2.0
21	Switzerland	13.1	10.1	3.1	23.8	2.3	25.6	2.8	2.4	4.9
22	UK	17.4	5.7	4.7	20.6	4.3	24.3	4.7	3.4	3.3
23	USSR	9.3	4.6	2.1	16.6	3.0	43.6	6.4	3.4	2.9
24	W Germany	11.4	12.5	4.1	18.8	3.4	18.6	5.2	1.5	3.8
25	Yugoslavia	4.4	5.0	1.2	9.5	0.6	55.9	3.0	5.7	3.2

### Úloha B4.19 Struktura odpovědí pacientů s AIDS o spokojenosti s ošetřujícím lékařem (FACT)

Data: B419x1 odpověď na 1. otázku, B419x2 odpověď na 2. otázku, ..., B419x14 odpověď na 14. otázku.

	B419x1	B419x2	B419x3	B419x4	B419x5	B419x6	B419x7	B419x8	B419x9	B419x10	B419x11	B419x12	B419x13	B419x14
B419x1	1													
B419x2	0.56	1												
B419x3	0.63	0.58	1											
B419x4	0.64	0.46	0.35	1										
B419x5	0.52	0.44	0.5	0.52	1									
B419x6	0.7	0.51	0.49	0.52	0.54	1								
B419x7	0.15	0.48	0.28	0.34	0.38	0.63	1							
B419x8	0.61	0.68	0.44	0.43	0.56	0.64	0.49	1						
B419x9	0.79	0.58	0.66	0.55	0.66	0.64	0.34	0.7	1					
B419x10	0.57	0.63	0.4	0.55	0.54	0.58	0.65	0.62	0.62	1				
B419x11	0.32	0.27	0.33	0.21	0.13	0.26	0.22	0.24	0.17	0.25	1			
B419x12	0.55	0.72	0.51	0.49	0.63	0.62	0.47	0.75	0.7	0.67	0.31	1		
B419x13	0.69	0.51	0.6	0.54	0.51	0.73	0.44	0.5	0.66	0.53	0.24	0.65	1	
B419x14	0.62	0.42	0.33	0.47	0.38	0.58	0.51	0.49	0.53	0.56	0.23	0.51	0.56	1

### Úloha B4.20 Struktura kostry kuřat (PCA, FACT)

Data: B420x1 délka lebky, B420x2 šířka lebky, B420x3 délka stehenní kosti, B420x4 délka holení kosti, B420x5 délka pažní kosti, B420x6 délka loketní kosti.

	B420x1	B420x2	B420x3	B420x4	B420x5	B420x6
B420x1	1					
B420x2	0.505	1				
B420x3	0.569	0.422	1			
B420x4	0.602	0.467	0.926	1		
B420x5	0.621	0.482	0.877	0.874	1	
B420x6	0.603	0.45	0.878	0.894	0.937	1

## 4.9.2 Analýza chemických a fyzikálních dat

### Úloha C4.01 Faktory ovlivňující koloristickou vydatnost versálové zeleně GL (EDA, CORA, PCA, FACT)

Data: C401i index vzorku, C401x1 obsah dusitanu, C401x2 obsah modří, C401x3 obsah žluti, C401x4 pH, C401x5 měření synthaminu, C401x6 výtěžek, C401x7 odstínové odchylky dR, C401x8 dH, C401x9 síla.

i	C401x1	C401x2	C401x3	C401x4	C401x5	C401x6	C401x7	C401x8	C401x9
1	35.5	18.52	30.73	3.47	6.5	43.2	0.7	-0.38	100
2	35.5	18.64	30.73	0.00	6.5	46.0	1.9	-0.94	112
3	35.0	18.46	30.55	6.73	9.7	44.0	0.5	-0.15	98
4	35.0	18.46	30.55	1.68	9.8	44.0	1.0	-0.39	100
5	35.8	18.49	31.25	3.35	6.3	45.0	-0.2	0.34	99
6	34.8	18.51	30.30	3.20	6.8	46.0	-0.3	0.48	98
7	34.9	15.00	30.38	3.34	7.4	44.0	-5.0	1.40	98
8	34.9	15.00	30.38	3.19	7.4	46.0	-3.3	1.71	100
9	34.5	16.51	30.03	3.30	8.5	44.0	-1.4	0.96	98
10	34.5	16.47	30.97	0.00	10.0	49.0	-1.4	0.72	105

### Úloha C4.02 Analýza kvality a znečištění různých šarží síry mleté (EDA, CORA, PCA, FACT)

Data: C402i index vzorku, C402x1 číslo šarže, C402x2 hmotnost, C402x3 vlhkost v %, C402x4 olej v %.

C402i	C402x1	C402x2	C402x3	C402x4
1	5	2400	0.09	1.01
2	6	5250	0.09	1.01
3	7	9750	0.10	1.05
4	10	3750	0.09	0.92
5	11	7500	0.10	0.89
6	12	5600	0.11	0.85
7	18	7500	0.01	1.02
8	19	7500	0.10	1.00
9	20	7200	0.10	1.01
10	21	5600	0.00	0.99
11	22	7200	0.11	0.99
12	23	7200	0.10	0.95
13	24	7200	0.11	0.95
14	25	7500	0.10	0.91

15	26	7500	0.11	0.97
16	29	3000	0.02	1.00
17	30	7500	0.04	0.97
18	31	7200	0.02	0.85
19	32	7200	0.01	0.88
20	33	7200	0.00	0.90
21	34	5600	0.10	1.02
22	35	3200	0.10	0.97
23	36	3280	0.10	0.98
24	37	2400	0.09	1.04
25	38	2400	0.11	0.98
26	39	5250	0.11	0.92
27	40	7500	0.11	0.99
28	41	7500	0.10	1.00
29	45	6750	0.00	0.95
30	46	7500	0.10	0.87
31	47	7500	0.00	1.03
32	48	7500	0.09	1.29
33	54	6750	0.11	1.06
34	55	7500	0.01	1.02
35	56	7500	0.01	1.03
36	57	9000	0.11	0.94
37	62	7200	0.01	0.89
38	63	7200	0.09	0.86
39	64	7500	0.10	1.00
40	65	7500	0.10	0.96
41	70	3000	0.10	0.92
42	71	5250	0.10	0.99
43	72	3750	0.10	1.03
44	73	7500	0.10	0.90
45	74	7500	0.03	0.88
46	75	7500	0.01	0.88
47	76	7500	0.01	0.98
48	77	7500	0.11	1.05
49	78	7500	0.09	0.90
50	79	7500	0.00	0.87

**Úloha C4.03** Popis rozdílů polyesterových vláken (EDA, CORA, PCA, FACT)

Data: C403i index vlákna, C403x1 množství aviváže, C403x2 jemnost.

	C403i	C403x1	C403x2
1	0.9	66	
2	0.8	65	
3	0.9	67	
4	0.7	68	
5	0.8	70	
6	0.6	66	
7	0.8	64	
8	0.9	65	
9	1.2	66	
10	1.1	62	
11	1.0	66	
12	0.9	67	
13	0.7	68	
14	0.8	69	
15	1.1	64	
16	1.0	65	
17	0.7	66	
18	0.8	67	
19	0.9	69	
20	0.8	68	
21	1.0	67	





(17)	0.4870	0.5117	0.5629	0.6341	0.7113	0.7664	0.7946	0.7916	0.7476	0.6821	0.6108	0.5272
	0.4294	0.3254	0.2298	0.1534	0.0992	0.0640	0.0418	0.0271	0.0176	0.0113	0.0066	0.0055
(18)	0.4858	0.5103	0.5617	0.6334	0.7109	0.7662	0.7939	0.7903	0.7458	0.6792	0.6074	0.5233
	0.4257	0.3219	0.2267	0.1511	0.0972	0.0626	0.0407	0.0264	0.0172	0.0110	0.0067	0.0057
(19)	0.4864	0.5102	0.5623	0.6339	0.7106	0.7659	0.7934	0.7893	0.7442	0.6778	0.6054	0.5214
	0.4235	0.3199	0.2250	0.1497	0.0960	0.0617	0.0401	0.0263	0.0170	0.0116	0.0072	0.0058
(20)	0.4760	0.5000	0.5518	0.6237	0.6988	0.7530	0.7792	0.7751	0.7289	0.6625	0.5903	0.5067
	0.4095	0.3075	0.2141	0.1409	0.0892	0.0564	0.0362	0.0238	0.0164	0.0115	0.0078	0.0073

#### Úloha C4.06 Počet částic absorbujících světlo faktorovou analýzou spekter

Data: Charakter proměnných: absorbanční matice u směsi m-CAPAZOXS - Zn<sup>2+</sup> naměřena: kyveta 2.996 cm, 25 °C, octanový pufr pH 5, koncentrace c<sub>Zn</sub> [mol/l] a molární poměr složek M:L pro spektra (řádky):

(1)	1.940E-06	0.051,	(2)	3.879E-06	0.102,	(3)	5.819E-06	0.152,
(4)	7.757E-06	0.203,	(5)	1.163E-05	0.305,	(6)	1.551E-05	0.406,
(7)	2.325E-05	0.609,	(8)	3.486E-05	0.914,	(9)	4.646E-05	1.219,
(10)	5.804E-05	1.523,	(11)	6.960E-05	1.828,	(12)	8.501E-05	2.234,
(13)	1.004E-04	2.641,	(14)	1.157E-04	3.047,	(15)	1.349E-04	3.555,
(16)	1.731E-04	4.570,	(17)	2.680E-04	7.109,	(18)	4.552E-04	12.188,
(19)	6.389E-04	17.266,	(20)	9.259E-04	25.391			

Absorbance pro vlnové délky, které zde představují proměnné (sloupce) [nm]:

(Spektrum)	x <sub>1</sub> 380,	x <sub>2</sub> 390,	x <sub>3</sub> 400,	x <sub>4</sub> 410,	x <sub>5</sub> 420,	x <sub>6</sub> 430,	x <sub>7</sub> 440,	x <sub>8</sub> 450,	x <sub>9</sub> 460,	x <sub>10</sub> 470,	x <sub>11</sub> 480,	x <sub>12</sub> 490,
	x <sub>13</sub> 500,	x <sub>14</sub> 510,	x <sub>15</sub> 520,	x <sub>16</sub> 530,	x <sub>17</sub> 540,	x <sub>18</sub> 550,	x <sub>19</sub> 560,	x <sub>20</sub> 570,				
(1)	0.5160	0.4958	0.4938	0.5022	0.5262	0.5583	0.6049	0.6838	0.7683	0.8376	0.9159	0.9349
	0.8532	0.7873	0.7118	0.5091	0.2448	0.0916	0.0331	0.0139				
(2)	0.5304	0.5253	0.5364	0.5537	0.5787	0.6024	0.6409	0.7032	0.7741	0.8243	0.8766	0.8745
	0.7860	0.7066	0.6344	0.4536	0.2170	0.0804	0.0296	0.0119				
(3)	0.5418	0.5539	0.5762	0.5987	0.6260	0.6456	0.6720	0.7243	0.7761	0.8074	0.8348	0.8118
	0.7146	0.6346	0.5579	0.3952	0.1917	0.0734	0.0279	0.0123				
(4)	0.5500	0.5773	0.6106	0.6395	0.6676	0.6826	0.6993	0.7385	0.7751	0.7883	0.7917	0.7503
	0.6456	0.5601	0.4838	0.3401	0.1656	0.0646	0.0251	0.0116				
(5)	0.5635	0.6151	0.6664	0.7060	0.7360	0.7414	0.7424	0.7615	0.7736	0.7573	0.7218	0.6489
	0.5342	0.4398	0.3629	0.2507	0.1237	0.0498	0.0209	0.0104				
(6)	0.5743	0.6460	0.7119	0.7600	0.7912	0.7891	0.7772	0.7790	0.7712	0.7309	0.6640	0.5660
	0.4428	0.3413	0.2643	0.1781	0.0898	0.0385	0.0175	0.0096				
(7)	0.5842	0.6743	0.7549	0.8106	0.8429	0.8338	0.8099	0.7957	0.7683	0.7052	0.6079	0.4856
	0.3545	0.2460	0.1689	0.1077	0.0569	0.0274	0.0137	0.0083				
(8)	0.5865	0.6847	0.7692	0.8289	0.8619	0.8505	0.8232	0.8030	0.7685	0.6968	0.5894	0.4577
	0.3240	0.2127	0.1353	0.0834	0.0464	0.0242	0.0131	0.0083				
(9)	0.5880	0.6878	0.7750	0.8355	0.8684	0.8559	0.8276	0.8053	0.7698	0.6959	0.5845	0.4506
	0.3159	0.2038	0.1258	0.0765	0.0440	0.0237	0.0135	0.0088				
(10)	0.5879	0.6884	0.7770	0.8366	0.8705	0.8580	0.8284	0.8064	0.7690	0.6945	0.5821	0.4471
	0.3117	0.1994	0.1211	0.0732	0.0426	0.0234	0.0135	0.0089				
(11)	0.5877	0.6886	0.7770	0.8378	0.8715	0.8592	0.8290	0.8061	0.7688	0.6933	0.5803	0.4442
	0.3090	0.1962	0.1177	0.0699	0.0406	0.0225	0.0131	0.0087				
(12)	0.5884	0.6899	0.7783	0.8386	0.8724	0.8595	0.8293	0.8067	0.7688	0.6933	0.5793	0.4428
	0.3076	0.1941	0.1158	0.0688	0.0403	0.0224	0.0129	0.0087				
(13)	0.5879	0.6895	0.7775	0.8386	0.8727	0.8595	0.8301	0.8075	0.7685	0.6931	0.5790	0.4427
	0.3067	0.1934	0.1147	0.0680	0.0401	0.0225	0.0135	0.0092				
(14)	0.5877	0.6897	0.7785	0.8392	0.8730	0.8601	0.8301	0.8072	0.7690	0.6931	0.5789	0.4416
	0.3063	0.1928	0.1139	0.0672	0.0397	0.0225	0.0134	0.0091				
(15)	0.5889	0.6905	0.7788	0.8404	0.8743	0.8607	0.8310	0.8080	0.7698	0.6937	0.5795	0.4424
	0.3070	0.1932	0.1144	0.0677	0.0405	0.0236	0.0145	0.0103				
(16)	0.5870	0.6890	0.7778	0.8386	0.8727	0.8589	0.8290	0.8067	0.7681	0.6925	0.5775	0.4404
	0.3046	0.1911	0.1121	0.0655	0.0389	0.0223	0.0138	0.0095				
(17)	0.5851	0.6866	0.7750	0.8358	0.8696	0.8565	0.8262	0.8035	0.7654	0.6895	0.5750	0.4383
	0.3031	0.1895	0.1105	0.0644	0.0379	0.0221	0.0136	0.0097				
(18)	0.5795	0.6804	0.7683	0.8281	0.8619	0.8488	0.8193	0.7970	0.7585	0.6833	0.5701	0.4345
	0.3000	0.1875	0.1089	0.0633	0.0375	0.0220	0.0140	0.0101				
(19)	0.5748	0.6749	0.7611	0.8213	0.8547	0.8418	0.8123	0.7901	0.7522	0.6778	0.5653	0.4307
	0.2977	0.1855	0.1074	0.0620	0.0366	0.0215	0.0139	0.0100				
(20)	0.5678	0.6660	0.7517	0.8106	0.8432	0.8307	0.8019	0.7793	0.7426	0.6689	0.5581	0.4253
	0.2937	0.1830	0.1059	0.0610	0.0362	0.0214	0.0140	0.0102				



(19)	0.4003	0.2888	0.2180	0.1898	0.2150	0.2786	0.3730	0.4984	0.6224	0.6965	0.7551	
	0.8063	0.8889	0.9355	0.8987	0.7822	0.6073	0.4334	0.2949	0.1987	0.1483	0.1311	0.1314
	0.1413	0.1608	0.1839	0.2119	0.2440	0.2790	0.3178	0.3602	0.4056	0.4531	0.5017	0.5516
	0.5980	0.6417	0.6809	0.7151	0.7431	0.7663	0.7817	0.7924				

#### Úloha C4.08 Analýza komerčního typu granulátu polyethylenu

*Data:* Charakter proměnných (sloupce):  $Typ$  je proměnná nominálního charakteru a označuje pomocí kódového čísla komerční typ,  $x_1$  je index toku taveniny při 210 °C a zatížení 49 N v g/10 min,  $x_2$  je index toku taveniny při 210 °C a zatížení 21 N v g/10 min,  $x_3$  je hustota granulátu při 23 °C v kg/m<sup>3</sup>,  $x_4$  je rázová houževnatost metodou Charpy při 23 °C v kJ/m<sup>2</sup>,  $x_5$  je mez kluzu v MPa,  $x_6$  je napětí při přetržení v Mpa,  $x_7$  tažnost na mezi kluzu v %,  $x_8$  celkové protažení při přetržení v %,  $x_9$  je tvrdost ve stupních Shore stupnice D.

$Typ$	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$
BB10	15.32	943.40	14.72	20.30	28.02	7.50	510.50	60.00	0.05
BB10	16.32	948.60	19.78	26.86	7.40	493.00	63.00	62.00	0.05
BB10	15.40	943.40	12.36	20.64	29.01	7.80	514.80	60.00	0.06
BB10	16.08	943.40	14.13	24.50	26.89	7.00	442.00	62.00	0.04
BB10	16.00	944.40	15.34	20.30	29.90	5.90	525.00	66.00	0.02
BB28	20.30	953.30	16.67	25.14	34.60	12.10	613.00	62.00	0.07
BB28	21.72	952.00	14.85	23.70	34.30	6.10	654.00	64.00	0.03
BB28	32.49	944.00	15.47	27.40	18.20	5.60	317.00	68.00	0.04
BB29	15.93	951.40	15.96	25.03	35.38	9.50	548.00	62.00	0.02
BB29	16.19	952.00	15.69	25.13	33.78	9.30	531.00	63.00	0.02
BB29	15.09	951.40	15.96	24.25	32.20	7.40	530.90	62.00	0.02
BB29	16.27	949.00	14.52	23.30	31.00	5.60	539.00	66.00	0.02
BB29	15.46	951.00	16.31	26.80	34.90	5.70	538.00	67.00	0.01
BB29	15.43	951.20	15.16	24.33	33.69	6.80	545.80	63.00	0.02
BB29	15.15	950.00	24.24	30.71	6.50	523.50	64.00	65.00	0.09
BB29	15.79	952.20	23.57	33.59	6.90	548.50	66.00	63.00	0.08
BB29	18.28	953.50	24.50	34.26	7.20	568.00	64.00	68.00	0.06
BB29	17.55	952.50	14.18	24.25	32.16	6.00	534.00	64.00	0.03
BB29	17.57	952.50	13.98	25.46	34.85	7.40	564.80	60.00	0.03
BB29	17.40	952.80	14.59	25.83	34.17	6.80	565.60	63.00	0.01
BB29	16.94	953.00	14.04	25.60	21.50	5.30	421.00	65.00	0.02
BB29	16.94	953.00	14.94	25.60	21.50	5.30	421.00	65.00	0.02
BB29	16.39	951.30	14.14	26.08	34.10	6.20	543.00	63.00	0.02
BB29	15.85	951.20	23.82	33.36	7.10	532.00	0.04	65.00	0.08
BB29	17.13	952.60	24.50	25.50	5.30	409.00	0.03	59.00	0.05
BB29	16.78	952.00	24.50	26.00	5.70	462.00	0.01	58.00	0.03
BB29	17.31	954.00	13.72	25.70	32.10	5.10	523.00	65.00	0.02
BB29	18.51	954.00	12.91	24.90	32.40	5.30	565.00	64.00	0.01
BB29	17.69	953.00	15.47	24.30	32.00	5.40	536.00	64.00	0.02
BB29	17.69	953.00	15.47	24.30	32.00	5.40	536.00	64.00	0.02
BB29	16.49	953.00	14.55	24.10	25.50	5.40	495.00	65.00	0.02
BB29	15.63	949.00	23.70	23.30	5.40	461.00	65.00	63.00	0.04
BB29	16.28	949.10	14.80	24.30	32.10	5.50	558.00	65.00	0.04
BB29	15.21	951.50	15.13	26.10	28.70	5.50	505.00	66.00	0.02
BB29	15.36	952.30	15.35	30.40	34.60	6.60	525.00	68.00	0.01
BB38	32.52	953.60	23.57	32.86	7.50	676.30	65.00	65.00	0.05
BB38	33.66	951.70	11.39	24.20	31.60	6.40	675.00	63.00	0.07
BB38	28.79	949.00	12.56	23.30	32.80	6.50	656.00	66.00	0.04
BB38	31.85	951.60	13.13	24.98	34.06	10.50	686.00	63.00	0.08
FB10	15.16	944.70	13.75	20.18	30.00	7.20	511.00	62.00	0.02
FB10	12.43	944.60	13.05	22.30	24.20	5.80	430.00	65.00	0.02
FB10	15.00	944.30	19.20	29.00	6.10	524.00	456.00	56.00	0.06
FB10	12.40	944.20	15.87	18.80	33.80	6.20	489.00	63.00	0.03
FB10	13.15	943.80	13.77	21.40	30.00	5.90	501.00	66.00	0.01
FB29	15.22	951.80	16.09	24.60	30.69	6.60	489.80	62.00	0.03
FB29	15.28	951.80	14.32	26.40	32.40	5.40	526.00	66.00	0.04
FB29	15.70	950.50	16.24	24.83	29.22	6.90	494.00	65.00	0.04
FB29	15.49	952.00	23.46	34.76	6.70	569.00	64.00	66.00	0.04
FB29	17.90	952.20	24.77	33.50	6.50	536.00	63.00	63.00	0.04
FB29	16.93	952.40	25.36	34.28	6.90	553.00	63.00	63.00	0.06
FB29	18.60	953.40	14.24	25.25	26.47	7.00	473.00	64.00	0.03
FB29	18.31	953.70	14.70	25.41	33.64	6.20	538.00	64.00	0.03

FB29	15.25	951.90	16.39	25.70	32.45	5.20	525.00	63.00	0.03
FB29	17.24	952.20	23.90	27.20	5.40	496.00	0.03	62.00	0.05
FB29	16.35	952.00	24.70	32.20	5.40	553.00	0.02	65.00	0.04
FB29	16.81	953.00	14.16	24.70	30.10	5.20	511.00	65.00	0.01
FB29	16.23	947.60	14.88	24.66	35.04	9.30	558.00	62.00	0.02
FB29	18.20	955.00	13.32	24.63	27.13	5.80	481.00	63.00	0.02
FB29	16.76	952.00	23.90	27.20	5.40	531.00	67.00	64.00	0.03
FB29	16.25	951.20	17.71	25.41	36.98	9.00	578.00	61.00	0.01
MB47	131.50	955.40	9.74	26.96	26.43	8.30	811.80	62.00	0.11
MB47	135.90	954.70	9.60	27.51	26.69	9.40	803.00	61.00	0.10
MB47	142.10	950.00	10.27	26.85	23.23	6.60	735.60	63.00	0.05
MB47	126.92	952.60	9.05	25.43	20.43	7.80	573.50	61.00	0.07
MB47	125.34	953.30	9.92	25.52	20.54	7.30	605.90	62.00	0.07
MB47	123.80	952.00	22.80	19.60	8.50	488.00	65.00	67.00	0.08
MB62	294.60	962.00	4.83	29.59	14.14	9.70	47.50	61.00	0.09
MB62	292.46	961.40	5.40	28.71	13.41	9.60	324.00	62.00	0.09
MB62	287.55	962.40	4.95	28.62	15.55	7.00	156.60	69.00	0.08
MB62	292.46	962.50	5.23	29.96	14.24	6.30	37.30	63.00	0.07
MB62	294.60	958.80	29.54	11.93	7.10	63.30	63.00	67.00	0.06
MB62	301.19	960.40	4.79	27.96	14.35	7.20	43.10	62.00	0.05
MB62	308.90	961.20	4.31	28.31	14.51	6.50	144.10	64.00	0.07
MB62	301.19	961.60	4.37	29.11	10.00	64.00	105.00	65.00	0.08
MB62	286.20	961.10	5.11	26.61	13.80	6.70	201.00	64.00	0.10
MB62	333.55	962.20	4.31	29.38	6.20	18.50	63.00	61.00	0.10
MB62	317.80	961.00	5.28	28.29	15.12	6.90	203.30	63.00	0.10
MB62	312.87	960.80	4.33	27.92	14.31	7.10	78.50	63.00	0.10
MB62	317.80	959.90	4.49	27.58	14.18	7.10	99.60	64.00	0.09
MB62	298.90	961.00	4.29	27.97	14.41	6.50	113.10	67.00	0.06
MB62	308.09	960.60	4.36	28.64	13.23	7.60	93.00	64.00	0.09
MB62	294.60	960.40	4.62	29.52	6.50	63.00	96.00	63.00	0.08
MB62	287.30	962.70	5.53	29.57	15.07	6.30	56.00	63.00	0.09
MB62	315.30	963.00	5.18	28.40	5.90	0.09	154.00	59.00	0.09
MB62	294.60	960.40	4.62	29.52	14.95	6.50	148.00	63.00	0.03
MB62	303.45	962.20	5.12	25.60	13.90	7.60	510.00	65.00	0.08
MB62	288.29	963.30	5.57	25.50	13.30	7.60	69.00	64.00	0.10
MB62	320.30	960.70	5.29	25.10	14.40	7.70	492.00	63.00	0.08
MB62	315.30	962.00	4.68	25.10	14.30	7.70	397.00	64.00	0.09
MB62	315.30	963.20	4.62	25.40	13.30	7.50	112.00	63.00	0.10
MB62	292.46	961.40	5.27	24.80	13.00	7.90	37.00	63.00	0.07
MB62	290.35	961.90	5.89	25.90	13.12	7.30	116.00	63.00	0.08
MB62	308.10	963.10	5.24	25.00	13.90	7.70	329.00	68.00	0.11
MB62	308.10	962.00	4.86	25.60	13.90	7.80	432.00	64.00	0.11
MB62	296.76	963.50	5.12	24.71	13.92	9.00	256.00	67.00	0.12
MB62	305.80	962.80	5.02	25.15	14.50	8.50	369.00	67.00	0.06
MB62	294.60	962.40	5.37	25.68	14.99	8.50	205.00	63.00	0.10
MB62	292.46	962.00	5.21	25.20	12.80	8.00	30.60	66.00	0.12
MB62	292.46	960.90	5.01	24.80	9.40	8.20	46.10	64.00	0.09
MB62	296.76	962.00	4.97	25.20	13.90	8.10	459.00	64.00	0.05
MB62	301.19	960.20	5.03	24.92	15.20	9.30	496.00	66.00	0.12
MB62	288.29	961.00	4.81	24.86	14.01	9.00	257.00	67.00	0.06
MB62	315.30	963.00	4.89	24.70	12.80	7.60	282.00	65.00	0.05
MB62	305.76	962.00	5.28	25.60	13.00	7.50	119.00	63.00	0.12
MB62	322.88	954.00	4.66	25.70	14.00	8.10	486.00	64.00	0.07
MB62	317.80	962.00	4.72	25.30	13.70	8.20	385.00	67.00	0.07
MB62	286.24	961.00	5.45	24.90	13.50	8.10	506.00	65.00	0.05
MB62	298.96	962.00	5.14	25.00	15.00	8.10	608.00	65.00	0.06
MB62	222.98	960.00	4.07	26.00	13.00	8.00	560.00	67.00	0.06
MB62	228.29	959.00	4.17	25.80	15.90	8.20	509.00	67.00	0.05
MB62	315.30	962.00	4.03	25.20	14.50	7.90	624.00	65.00	0.05
MB62	317.70	963.00	4.07	25.90	12.70	9.20	601.00	65.00	0.07
MB62	315.30	962.00	4.57	24.90	12.70	8.20	395.00	67.00	0.07

MB62	310.50	963.00	4.21	25.20	12.50	8.00	567.00	65.00	0.07
MB62	290.30	963.00	4.15	25.70	14.20	7.80	591.00	66.00	0.06
MB62	298.90	962.00	4.14	25.40	13.80	7.70	535.00	67.00	0.04
MB62	294.60	962.80	4.08	25.60	13.30	7.50	571.00	67.00	0.05
MB62	312.90	961.80	4.08	25.00	13.90	8.30	646.00	66.00	0.05
MB62	309.90	961.90	4.15	24.90	13.70	8.10	672.00	66.00	0.06
MB62	305.75	962.40	4.24	26.60	14.30	8.10	647.00	69.00	0.03
MB62	308.90	962.00	4.06	25.70	8.10	7.80	564.00	68.00	0.03
MB62	312.80	962.80	4.16	25.50	13.40	8.40	609.00	69.00	0.07
MB62	290.30	962.30	6.22	25.40	14.10	7.80	322.00	67.00	0.09
MB62	298.90	962.00	4.08	26.20	13.60	7.90	587.00	67.00	0.06
MB62	305.70	962.60	4.17	26.30	13.30	7.80	595.00	67.00	0.06
MB62	315.30	962.00	4.01	25.90	14.30	8.10	597.00	68.00	0.07
MB62	305.76	960.50	4.17	25.50	10.80	8.10	495.00	67.00	0.05
MB62	317.80	963.70	4.28	26.00	12.10	8.10	621.00	67.00	0.06
ML62	290.35	958.60	5.07	28.98	14.24	6.80	103.30	63.00	0.08
ML62	315.32	960.60	5.09	27.59	13.94	6.90	107.50	64.00	0.09
ML62	276.44	962.00	4.98	25.10	12.40	8.00	128.00	66.00	0.06
ML62	290.36	962.90	4.55	25.16	13.76	9.00	453.00	67.00	0.16
ML62	292.46	962.00	4.95	24.50	13.90	8.70	473.00	65.00	0.07
ML62	301.90	959.40	4.58	25.70	11.30	8.40	92.00	66.00	0.08
TB38	33.00	951.50	12.62	25.85	36.30	11.00	695.00	63.00	0.07
TB38	31.53	952.20	11.38	23.80	23.60	6.40	553.00	63.00	0.07
TB38	34.15	954.20	24.12	31.57	8.00	638.80	64.00	64.00	0.09
TB38	30.76	952.70	11.77	24.74	33.37	7.60	653.00	63.00	0.06
TB38	31.61	953.00	12.00	23.20	31.20	6.70	642.00	65.00	0.03
VB33	23.33	957.30	17.54	27.61	34.03	9.80	617.00	64.00	0.09
VB33	22.42	954.90	19.26	26.70	30.90	5.50	601.00	65.00	0.07
VB33	22.85	955.00	20.49	26.40	29.30	5.30	594.00	65.00	0.05
VB33	23.06	956.60	25.50	33.30	5.40	672.00	63.00	66.00	0.06
VB33	22.79	955.30	19.04	25.70	24.40	5.40	545.00	63.00	0.06
VB33	21.43	956.20	26.00	34.00	5.50	662.00	658.00	67.00	0.08
VB33	22.21	955.70	25.00	22.10	5.60	551.00	745.00	59.00	0.05
VB33	23.10	955.00	20.77	26.50	30.90	5.40	591.00	65.00	0.03
VB33	21.85	956.00	20.75	26.10	12.60	6.40	146.00	66.00	0.03
VB33	22.80	955.00	17.74	26.20	23.50	5.50	542.00	65.00	0.04
VB33	23.01	955.00	17.98	26.80	32.00	5.30	631.00	64.00	0.04
VB33	22.13	957.60	18.35	30.30	6.40	41.00	705.00	68.00	0.05
VB33	22.03	955.80	23.22	26.97	34.53	6.80	639.30	64.00	0.07
VB33	20.85	954.10	26.05	31.04	7.00	609.60	65.00	69.00	0.07
VB33	22.13	954.00	26.33	32.89	7.30	619.30	64.00	68.00	0.06
VB33	22.56	955.00	26.36	30.96	7.10	600.00	65.00	65.00	0.08
VB33	23.56	956.90	21.65	27.58	35.90	10.70	678.30	65.00	0.04
VB33	22.55	953.40	19.80	26.05	33.29	7.00	614.00	65.00	0.06
VB33	21.43	957.40	18.25	18.25	34.46	6.90	636.00	63.00	0.04
VB33	21.66	955.00	20.53	26.20	31.70	5.30	620.00	63.00	0.06
VB33	22.25	955.30	25.70	33.40	5.60	650.00	632.00	66.00	0.05
VB33	20.33	955.00	25.70	30.40	5.50	612.00	634.00	62.00	0.05
VB33	23.10	952.50	18.97	27.40	36.08	9.00	693.50	65.00	0.06
VB33	20.76	957.00	25.20	31.10	5.40	650.00	67.00	63.00	0.06
VB33	21.21	957.00	19.34	25.30	31.70	5.50	631.00	66.00	0.01
VB33	20.64	957.00	25.20	30.30	5.70	609.00	64.00	65.00	0.05
VB33	24.42	956.80	19.21	26.91	37.61	8.60	702.00	62.00	0.06
VB33	21.00	954.60	25.00	34.20	5.70	651.00	67.00	69.00	0.08
VB33	20.97	957.30	19.95	24.30	29.70	5.90	608.00	66.00	0.02
VB33	20.69	956.80	20.36	24.70	25.40	5.80	537.00	67.00	0.02
VB33	21.92	954.00	20.62	27.70	24.10	5.50	413.00	68.00	0.02
VB33	21.88	954.40	23.33	27.20	31.50	5.60	572.00	68.00	0.02
VB33	30.52	956.00	23.48	29.90	33.70	6.20	609.00	67.00	0.03
ZB20	15.08	943.70	13.57	20.36	19.19	9.60	354.80	62.00	0.02
ZB20	13.86	945.00	13.52	19.80	11.70	6.00	246.00	64.00	0.03

ZB20	17.38	944.70	13.01	24.40	14.90	7.40	202.00	64.00	0.04
ZB20	13.77	946.20	13.08	22.73	16.47	10.00	271.00	62.00	0.05
ZB20	15.09	944.00	19.77	16.59	7.40	319.00	61.00	64.00	0.04
ZB20	15.81	944.80	11.32	20.01	17.37	7.80	331.30	60.00	0.02
ZB62	336.30	962.20	64.00	24.00	17.78	8.70	321.00	62.00	0.06
ZB62	305.75	961.60	29.34	8.80	11.30	65.00	347.00	85.00	0.05
ZB62	282.24	961.80	0.16	25.00	11.00	56.00	358.00	74.00	0.04
ZB70	5.37	943.60	23.75	24.70	27.50	7.50	376.00	65.00	0.06
ZS70	5.78	943.00	25.25	21.90	22.60	5.90	341.00	65.00	0.02
ZS70	5.85	943.80	19.56	26.96	7.80	433.00	62.00	58.00	0.05
ZS70	5.62	942.50	23.07	21.12	27.77	10.00	430.00	63.00	0.02

#### Úloha C4.09 Analýza komerčního granulátu polypropylenu (EDA, PCA, CLU)

Data: C409i je index várky, C409x1 je index toku taveniny při 210 °C a zatížení 21 N v g/10 min (TI2), C409x2 je index toku taveniny při 210 °C a zatížení 49 N v g/10 min (TI5), C409x3 je index toku taveniny při 210 °C a zatížení 212 N v g/10 min, C409x4 je poměr indexů toku při zatíženích 212 a 21 N (MFR) bezrozměrná veličina, C409x5 hustota granulátu při 23 °C v kg/m<sup>3</sup>, C409x6 pevnost na mezi skluzu (MK) v MPa, C409x7 je napětí při přetržení (NPP) v MPa, C409x8 tažnost na mezi kluzu v %, C409x9 celková tažnost (CT) v %, C409x10 doba do prasknutí při trubkovém testu (TrT) v hod.

C409i	C409x1	C409x2	C409x3	C409x4	C409x5	C409x6	C409x7	C409x8	C409x9	C409x10
2	0.080	0.056	15.350	191.900	0.955	21.400	34.700	9.400	573	572
33	0.069	0.410	11.530	167.100	0.952	20.300	33.900	9.900	546	962
37	0.066	0.380	11.460	173.600	0.952	20.500	33.500	10.100	529	2475
47	0.087	0.490	13.490	155.000	0.955	21.400	34.300	9.700	527	769
161	0.079	0.480	14.600	184.800	0.955	21.800	31.200	10.000	527	697
173	0.089	0.510	14.950	168.000	0.955	21.500	31.000	9.400	520	192
185	0.078	0.470	14.800	189.700	0.955	22.900	30.600	8.900	504	349
190	0.082	0.490	14.760	180.000	0.955	22.000	32.500	9.800	527	349
195	0.078	0.460	14.190	181.900	0.955	21.500	30.300	9.800	514	326
196	0.078	0.460	13.320	171.000	0.954	21.400	31.000	9.900	526	637
209	0.064	0.400	12.280	191.900	0.954	20.000	30.100	7.600	504	723
213	0.074	0.460	13.600	183.300	0.954	19.900	29.500	7.000	505	980
215	0.080	0.480	13.830	173.100	0.954	19.500	30.300	7.500	525	741
219	0.074	0.450	12.620	163.100	0.954	20.200	33.000	7.500	544	297
223	0.089	0.530	13.660	154.000	0.954	20.600	31.100	7.000	544	362
251	0.075	0.460	13.800	184.000	0.955	21.200	29.700	7.300	517	238
258	0.084	0.470	14.490	172.500	0.955	21.900	29.600	7.300	496	236
272	0.088	0.510	14.700	167.000	0.955	21.000	29.200	7.100	508	290
276	0.092	0.530	15.840	172.100	0.954	21.700	30.600	7.000	522	526
279	0.089	0.450	15.720	176.600	0.955	20.700	31.200	7.500	523	383
282	0.091	0.490	14.520	159.600	0.954	20.800	29.900	6.500	516	620
287	0.078	0.420	13.960	179.000	0.955	21.500	28.400	6.800	502	238
292	0.077	0.470	12.700	164.900	0.955	21.000	30.700	7.000	518	759
294	0.073	0.420	12.790	175.200	0.954	19.600	31.300	7.400	525	570
298	0.073	0.440	13.200	180.800	0.954	19.700	30.200	7.300	515	830
301	0.074	0.420	12.580	170.000	0.953	19.500	30.500	7.800	527	1168
304	0.080	0.490	13.780	172.300	0.953	20.100	30.800	7.100	519	886
308	0.074	0.450	13.790	186.400	0.954	20.100	29.500	7.700	501	378
334	0.077	0.460	13.070	169.700	0.956	20.600	30.400	7.500	541	900
341	0.072	0.440	15.200	211.400	0.955	19.700	29.000	7.500	514	999
419	0.072	0.460	13.000	180.600	0.956	20.500	30.700	6.500	543	495
449	0.082	0.490	14.360	175.100	0.953	19.000	30.100	6.900	538	265
462	0.080	0.480	14.770	184.600	0.953	19.800	30.300	7.800	525	485
463	0.080	0.500	14.660	183.300	0.953	20.300	28.300	7.300	501	443
494	0.080	0.440	14.500	18.100	0.955	20.100	28.800	7.500	510	246
535	0.090	0.500	15.070	167.400	0.952	21.400	30.600	6.800	525	190
586	0.080	0.460	13.730	171.600	0.956	21.000	32.100	7.000	526	287
589	0.070	0.390	11.880	169.700	0.956	20.300	31.200	7.500	514	1189
594	0.080	0.450	12.570	157.100	0.955	19.900	31.300	7.400	524	381
596	0.080	0.450	12.660	154.400	0.953	20.700	31.800	7.100	519	417
598	0.080	0.450	12.530	154.700	0.954	20.400	30.600	7.200	507	220
610	0.080	0.450	12.570	165.000	0.954	20.200	32.100	6.900	519	178
615	0.080	0.450	12.890	167.400	0.954	21.000	32.600	7.000	534	175

642	0.070	0.460	13.250	179.000	0.954	20.200	31.000	7.600	535	818
644	0.090	0.500	13.970	155.200	0.953	19.700	29.800	7.400	523	1478
678	0.080	0.440	12.370	152.700	0.953	19.900	32.600	6.300	542	272
705	0.080	0.440	12.060	160.800	0.953	19.900	31.300	7.000	536	240
714	0.090	0.510	13.780	148.200	0.956	20.900	31.600	7.100	519	862
719	0.080	0.390	13.640	172.700	0.953	22.200	31.700	6.500	529	233
747	0.080	0.450	11.820	144.100	0.952	20.800	32.600	6.600	531	1071
899	0.080	0.480	14.770	184.600	0.953	20.700	29.900	9.500	513	1351
741	0.080	0.420	11.860	148.300	0.953	20.500	29.100	6.000	772	2295
745	0.080	0.420	11.110	144.300	0.952	20.600	31.700	6.400	537	2558

**Úloha C4.10** *Vícerozměrná kalibrace bezolovnatých benzinů*

S pomocí dostupného software sestrojte vícerozměrný kalibrační model pro 4 parametry kvality benzinů presentované v kapitole 4.8. Interpretujte získané výsledky. Diskutujte aplikovatelnost metody pro rutinní analýzu.



**Úloha C4.11** Vícerozměrná kalibrace oceli pomocí ICP dat

Data:

<i>C413x1</i>	<i>C413x2</i>	<i>C413x3</i>
0.80	121.41	70.42
0.82	127.70	72.47
0.84	129.20	78.20
0.82	131.80	74.89
0.84	135.10	71.21
0.84	131.50	78.39
0.82	126.70	69.02
0.80	115.10	73.10
0.83	130.80	79.28
0.82	124.60	76.48
0.83	118.31	70.25
0.80	114.20	72.88
0.81	120.30	68.23
0.80	115.70	68.12
0.83	117.51	71.62
0.80	109.81	53.10
0.76	109.10	50.85
0.77	115.10	51.68
0.76	118.31	50.60
0.77	112.60	53.51
0.81	116.20	56.53
0.80	118.00	70.70
0.85	131.00	74.35
0.82	125.70	68.29
0.97	126.10	72.10
0.82	125.80	70.64
0.84	125.50	76.33
0.82	127.80	76.75
0.82	130.50	80.33
0.82	127.90	75.68
0.84	123.90	78.54
0.82	124.10	71.91
0.79	120.80	68.22
0.78	107.40	54.42
0.80	120.70	70.41
0.81	121.91	73.68
0.84	122.31	74.93
0.79	110.60	53.52
0.77	103.51	48.93
0.78	110.71	53.67
0.76	113.80	52.42

### 4.9.3 Analýza environmetálních, potravinářských a zemědělských dat

#### Úloha E4.01 Grafická prezentace a průzkumová analýza dat hornin z vrtů (EDA, PCA, CLU)

Data: E401i index objektu, proměnné E401x1 až E401x12 představují obsah 12 kationtů a aniontů [100 mg/kg] v hornině z vrtu 4500 stp hlubokého v horách v Coloradu.

$i$	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$	$x_{10}$	$x_{11}$	$x_{12}$
1	320	105	057	050	001	001	001	060	020	250	210	370
2	280	150	040	050	001	001	001	060	040	210	130	420
3	260	165	033	050	001	001	001	060	010	250	090	440
4	305	110	044	040	001	001	001	050	050	260	140	250
5	290	160	035	035	001	001	001	050	020	210	060	510
6	275	130	047	035	001	001	001	050	020	230	090	570
7	280	155	035	035	001	001	001	080	020	270	170	400
8	300	115	050	060	001	001	001	120	010	280	190	300
9	250	130	041	030	005	001	001	070	030	250	110	330
10	285	120	047	040	001	001	001	070	010	240	170	280
11	280	105	047	070	001	001	001	060	020	370	070	300
12	300	135	050	040	001	001	001	120	060	250	160	200
13	280	110	056	050	001	001	001	150	010	280	270	280
14	305	080	065	080	005	001	001	130	010	300	260	260
15	230	175	029	035	001	001	001	270	030	250	140	240
16	325	060	052	090	001	001	001	160	010	280	260	170
17	270	170	025	040	001	001	001	160	010	290	070	330
18	250	185	031	025	001	001	001	120	001	260	080	330
19	260	185	030	015	001	001	001	270	080	480	010	330
20	270	185	032	010	005	001	001	180	040	450	020	220
21	325	045	053	005	020	001	001	600	080	660	020	250
22	315	090	047	005	020	001	001	410	200	600	060	260
23	335	100	047	010	040	001	001	360	080	590	110	170
24	310	010	049	005	080	018	001	640	240	630	060	190
25	410	001	049	001	075	032	001	760	440	800	001	001
26	360	001	048	001	080	055	001	770	260	770	010	010
27	310	015	051	001	105	036	001	660	380	640	001	010
28	420	005	049	001	095	056	001	620	520	680	001	001
29	415	020	049	005	025	036	001	370	220	340	001	001
30	420	005	041	001	070	060	001	630	510	580	001	001
31	450	005	040	001	090	070	001	690	570	630	001	001
32	395	001	025	015	100	071	001	580	530	560	001	010
33	380	010	027	025	035	039	001	350	320	400	001	270
34	430	010	025	030	030	025	001	340	340	360	001	200
35	410	075	022	010	005	015	001	170	170	170	001	060
36	520	055	024	040	005	001	001	210	190	190	001	180
37	385	135	018	010	005	008	001	140	200	260	001	020
38	535	065	010	020	001	001	001	110	230	270	001	070
39	550	095	001	010	001	001	001	050	230	270	001	030
40	510	100	001	001	001	001	001	190	150	230	001	110
41	510	095	001	040	001	001	001	140	100	150	001	040
42	385	180	010	001	001	001	001	050	050	300	001	050
43	505	125	001	001	001	001	001	001	200	130	001	030
44	470	090	001	020	001	001	001	160	300	380	001	060
45	465	110	001	035	001	001	001	260	440	500	001	060
46	400	140	001	015	001	023	001	330	400	390	001	040
47	415	105	015	025	040	032	001	220	190	270	001	010
48	435	075	010	015	001	069	001	370	360	500	001	010
49	370	145	010	010	005	012	040	130	080	330	001	030
50	380	210	001	001	001	001	020	070	001	050	001	030
51	430	065	001	005	020	001	075	130	070	300	001	020
52	420	080	030	001	005	026	001	050	100	350	001	050
53	425	060	035	005	001	001	030	100	010	340	001	010
Min	250	001	001	001	001	001	001	001	001	050	001	001
Max	520	210	065	090	105	071	075	770	570	800	270	570

### Úloha E4.02 Sledování kvality říční vody v rozličných profilech

(a) *Data*: Charakter proměnných (sloupce):  $x_1$  je vodivost,  $x_2$  je tvrdost,  $x_3$  nerozpuštěné látky veškeré sušené při 105 °C,  $x_4$  nerozpuštěné látky žíhané při 550 °C,  $x_5$  nerozpuštěné látky ztráta žíháním (dopočet) [mg/l],  $x_6$  rozpuštěné látky sušené při 105 °C,  $x_7$  rozpuštěné látky žíhané při 550 °C [mg/l],  $x_8$  rozpuštěné látky ztráta žíháním (dopočet) [mg/l],  $x_9$  pH,  $x_{10}$  KNK45,  $x_{11}$  procento nasycení kyslíkem [%],

Matice dat (řádky) obsahuje řádek vzorku  $i$ , označení místa na profilu řeky a teplotu vody v °C:

1 MSH 1 0.2 °C, 2 MSH 2 4.8 °C, 3 MSH 3 1.9 °C, 4 MSH 4 8.9 °C, 5 MSH 5 9.7 °C, 6 MSH 6 14.7 °C, 7 MSH 7 16.5 °C, 8 MSH 8 12.4 °C, 9 MSH 9 11.9 °C, 10 OB 1 1.9 °C, 11 OB 2 5.0 °C, 12 OB 3 3.5 °C, 13 OB 4 8.5 °C, 14 OB 5 9.7 °C, 15 OB 6 14.1 °C, 16 OB 7 19.1 °C, 17 OB 8 20.7 °C, 18 OB 9 18.1 °C, 19 OLR 1 1.0 °C, 20 OLCT 1 1.3 °C, 21 OLV 1 1.4 °C, 22 OLR 2 2.0 °C, 23 OLCT 2 2.0 °C, 24 OLV 2 3.0 °C, 25 OLR 3 5.4 °C, 26 OLCT 3 5.9 °C, 27 OLV 3 6.2 °C, 28 OLR 4 5.4 °C, 29 OLCT 4 6.7 °C, 30 OLV 4 8.0 °C, 31 OLR 5 8.9 °C, 32 OLCT 5 10.8 °C, 33 OLV 5 12.4 °C, 34 OLR 6 13.2 °C, 35 OLCT 6 14.6 °C, 36 OLV 6 16.4 °C, 37 OLR 7 19.5 °C, 38 OLCT 7 19.7 °C, 39 OLV 7 20.9 °C, 40 OLR 8 16.9 °C, 41 OLCT 8 17.8 °C, 42 OLV 8 18.0 °C, 43 OLR 9 12.8 °C, 44 OLCT 9 13.5 °C, 45 OLV 9 14.6 °C, 46 OM 1 3.6 °C, 47 OM 2 8.1 °C, 48 OM 3 7.0 °C, 49 OM 4 7.5 °C, 50 OM 5 10.5 °C, 51 OM 6 18.3 °C, 52 OM 7 20.4 °C, 53 OM 8 20.6 °C, 54 OM 9 14.4 °C,

$i$	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$	$x_{10}$	$x_{11}$
1	19.4	0.832	25	14	11	146	97	49	7.55	0.7	13.593
2	18.9	0.840	42	21	21	143	95	48	7.47	0.5	12.698
3	21.2	0.826	29	15	14	160	106	54	7.31	0.8	14.110
4	17.0	0.479	10	5	5	129	86	43	7.28	0.7	10.490
5	15.8	0.633	11	6	5	125	84	41	7.49	0.6	10.189
6	18.3	0.761	18	10	8	139	88	51	7.26	1.0	7.574
7	24.3	0.765	15	8	7	185	123	62	7.77	1.3	7.981
8	20.6	0.689	13	6	7	155	104	51	7.81	1.2	9.185
9	22.3	0.806	27	13	14	169	110	59	7.70	1.2	8.579
10	70.2	1.826	13	8	5	561	372	189	7.86	2.1	12.489
11	46.0	1.258	25	14	11	393	289	104	7.69	1.3	12.799
12	59.4	1.427	22	9	13	476	315	161	7.82	1.6	13.198
13	38.3	1.108	23	11	12	289	193	96	7.55	1.4	12.310
14	53.9	1.117	17	10	7	350	280	70	7.46	1.4	9.584
15	53.2	1.685	1239	1084	155	394	261	133	7.51	2.7	7.876
16	53.5	1.085	65	43	22	425	324	101	7.62	1.5	6.571
17	117.8	1.814	38	27	11	845	651	194	7.57	3.0	4.146
18	98.3	2.862	23	12	11	742	491	251	7.82	2.1	5.457
19	22.1	0.953	12	7	5	177	100	77	7.85	1.2	15.410
20	26.9	1.019	11	6	5	211	143	68	7.84	1.4	14.910
21	220.0	3.509	20	10	10	1610	1325	285	7.65	1.9	13.193
22	19.7	0.737	20	4	16	158	99	59	7.98	1.2	14.510
23	23.0	1.002	11	3	8	183	114	69	7.87	1.1	14.410
24	113.4	1.811	22	10	12	850	570	280	7.89	1.8	13.197
25	23.0	0.912	12	5	7	170	110	60	7.29	1.1	13.210
26	27.8	1.214	11	6	5	202	130	72	7.47	1.5	12.298
27	170.3	3.045	12	5	7	1261	835	426	7.70	1.8	12.610
28	14.5	0.467	25	10	15	111	70	41	7.50	1.0	13.110
29	17.2	0.638	29	13	16	135	85	50	7.43	1.3	12.710
30	121.7	1.543	23	10	13	925	600	325	7.67	1.4	12.110
31	25.1	0.858	5	5	5	191	125	66	7.55	1.5	10.792
32	29.3	1.240	5	5	5	219	144	75	7.67	2.0	10.090
33	281.0	3.651	10	5	5	1919	1606	313	7.77	2.3	10.296
34	25.3	0.994	15	7	8	184	123	61	7.57	1.5	9.288
35	29.9	1.344	13	6	7	183	121	62	7.47	2.0	9.190
36	252.0	3.564	15	8	7	1892	1251	641	7.76	2.5	7.274
37	42.1	1.263	12	6	6	319	209	110	7.72	1.8	7.683
38	44.4	1.472	11	6	5	337	221	116	7.55	2.5	6.774
39	551.0	5.131	12	6	6	4139	2736	1403	7.80	2.5	6.674
40	45.0	1.727	16	9	7	398	279	119	7.75	2.0	8.184
41	49.7	1.890	15	8	7	397	274	123	7.53	2.4	6.973
42	412.0	4.969	35	23	12	3086	2035	1051	7.49	2.3	7.176
43	29.5	1.068	10	6	4	236	157	79	8.03	1.7	8.782
44	36.0	1.288	14	7	7	254	169	85	7.87	2.1	8.178
45	236.0	2.987	52	35	17	1519	1221	298	7.96	2.4	7.170
46	55.1	1.852	21	8	13	418	266	152	7.81	1.9	13.31
47	55.5	1.664	24	10	14	418	276	142	7.79	1.7	9.580
48	43.3	1.636	56	40	16	325	210	115	7.76	1.7	11.292
49	40.4	1.192	12	7	5	322	241	81	7.63	1.5	11.596

50	43.0	1.366	19	10	9	326	216	110	7.80	1.5	10.695
51	61.4	2.011	40	18	22	490	420	70	7.69	2.2	6.649
52	124.7	2.879	12	6	6	942	621	321	7.36	2.8	4.347
53	114.5	2.475	21	10	11	808	578	230	7.77	3.0	5.461
54	55.3	1.685	77	61	16	427	283	144	7.76	2.0	8.079

(b) *Data*: Charakter proměnných (sloupce):  $x_1$  koncentrace draslíku [mg/l],  $x_2$  koncentrace železa (celkového) [mg/l],  $x_3$  koncentrace manganu [mg/l],  $x_4$  koncentrace zinku [mg/l],  $x_5$  koncentrace mědi [mg/l],  $x_6$  koncentrace niklu [mg/l],  $x_7$  koncentrace chromu [mg/l].

Maticice dat (řádky) obsahuje řádek vzorku  $i$ , místo na profilu řeky a teplotu vody v °C:

1 MSH 1 0.2°C, 2 MSH 2 4.8°C, 3 MSH 3 1.9°C, 4 MSH 4 8.9°C, 5 MSH 5 9.7°C, 6 MSH 6 14.7°C, 7 MSH 7 16.5°C, 8 MSH 8 12.4°C, 9 MSH 9 11.9°C, 10 OB 1 1.9°C, 11 OB 2 5.0°C, 12 OB 3 3.5°C, 13 OB 4 8.5°C, 14 OB 5 9.7°C, 15 OB 6 14.1°C, 16 OB 7 19.1°C, 17 OB 8 20.7°C, 18 OB 9 18.1°C, 19 OLR 1 1.0°C, 20 OLCT 1 1.3°C, 21 OLV 1 1.4°C, 22 OLR 2 2.0°C, 23 OLCT 2 2.0°C, 24 OLV 2 3.0°C, 25 OLR 3 5.4°C, 26 OLCT 3 5.9°C, 27 OLV 3 6.2°C, 28 OLR 4 5.4°C, 29 OLCT 4 6.7°C, 30 OLV 4 8.0°C, 31 OLR 5 8.9°C, 32 OLCT 5 10.8°C, 33 OLV 5 12.4°C, 34 OLR 6 13.2°C, 35 OLCT 6 14.6°C, 36 OLV 6 16.4°C, 37 OLR 7 19.5°C, 38 OLCT 7 19.7°C, 39 OLV 7 20.9°C, 40 OLR 8 16.9°C, 41 OLCT 8 17.8°C, 42 OLV 8 18.0°C, 43 OLR 9 12.8°C, 44 OLCT 9 13.5°C, 45 OLV 9 14.6°C, 46 OM 1 3.6°C, 47 OM 2 8.1°C, 48 OM 3 7.0°C, 49 OM 4 7.5°C, 50 OM 5 10.5°C, 51 OM 6 18.3°C, 52 OM 7 20.4°C, 53 OM 8 20.6°C, 54 OM 9 14.4°C,

$i$	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$
1	1.90	0.13	0.15	0.08	0.0025	0.005	0.005
2	2.40	0.19	0.04	0.04	0.0050	0.005	0.005
3	2.10	0.18	0.09	0.03	0.0050	0.005	0.005
4	1.60	0.46	0.05	0.06	0.0070	0.005	0.005
5	1.40	0.31	0.04	0.04	0.0050	0.016	0.005
6	2.00	0.48	0.08	0.05	0.0060	0.010	0.005
7	2.10	0.68	0.17	0.05	0.0070	0.010	0.005
8	2.70	0.40	0.08	0.08	0.0060	0.005	0.005
9	2.40	0.23	0.05	0.06	0.0025	0.005	0.005
10	7.30	0.63	0.19	0.47	0.0080	0.020	0.005
11	5.20	0.93	0.12	0.11	0.0060	0.010	0.005
12	6.00	0.49	0.14	0.09	0.0070	0.011	0.005
13	5.00	0.53	0.10	0.14	0.0080	0.018	0.005
14	5.00	0.47	0.15	0.14	0.0070	0.012	0.005
15	6.20	50.50	1.16	0.42	0.0630	0.073	0.042
16	6.00	1.69	0.15	0.08	0.0100	0.014	0.005
17	10.20	0.36	0.30	0.65	0.0080	0.010	0.005
18	0.49	0.18	0.46	0.01	0.0100	0.005	0.010
19	3.40	0.24	0.03	0.09	0.0060	0.005	0.005
20	3.50	0.20	0.04	0.10	0.0060	0.011	0.005
21	10.70	0.55	0.15	0.09	0.0120	0.038	0.005
22	2.80	0.24	0.03	0.06	0.0025	0.005	0.005
23	3.10	0.51	0.04	0.06	0.0050	0.005	0.005
24	16.80	0.76	0.11	0.07	0.0090	0.029	0.005
25	3.50	0.17	0.04	0.12	0.0060	0.010	0.005
26	4.00	0.13	0.05	0.08	0.0060	0.011	0.005
27	9.10	0.48	0.18	0.08	0.0100	0.027	0.005
28	2.30	0.51	0.06	0.06	0.0060	0.005	0.005
29	2.70	0.46	0.03	0.04	0.0060	0.017	0.005
30	6.20	0.32	0.09	0.06	0.0110	0.021	0.005
31	4.30	0.24	0.06	0.09	0.0060	0.012	0.005
32	4.70	0.25	0.06	0.05	0.0050	0.013	0.005
33	6.60	0.25	0.19	0.06	0.0110	0.040	0.005
34	4.70	0.29	0.05	0.06	0.0070	0.016	0.005
35	4.70	0.27	0.04	0.06	0.0070	0.014	0.005
36	12.00	0.36	0.12	0.07	0.0180	0.036	0.012
37	8.40	0.26	0.08	0.11	0.0100	0.015	0.005
38	6.00	0.19	0.05	0.05	0.0080	0.016	0.005
39	15.50	0.36	0.21	0.06	0.0180	0.055	0.027
40	8.90	0.32	0.08	0.10	0.0070	0.014	0.005
41	9.80	0.15	0.04	0.07	0.0060	0.005	0.005
42	16.50	0.69	0.26	0.08	0.0110	0.030	0.005
43	4.90	0.13	0.05	0.07	0.0060	0.005	0.005
44	5.10	0.35	0.05	0.05	0.0060	0.005	0.005
45	11.40	0.90	0.17	0.10	0.0110	0.014	0.005
46	9.65	0.53	0.13	0.15	0.0080	0.013	0.005
47	10.90	0.55	0.14	0.18	0.0070	0.010	0.005
48	9.25	2.16	0.15	0.10	0.0100	0.014	0.005
49	6.80	0.67	0.11	0.22	0.0070	0.012	0.005
50	7.70	0.46	0.11	0.14	0.0070	0.012	0.005
51	10.20	0.79	0.13	0.13	0.0100	0.018	0.005

52	14.00	0.25	0.18	0.37	0.0090	0.021	0.012
53	14.00	0.67	0.18	0.21	0.0090	0.012	0.005
54	19.00	1.53	0.20	0.36	0.0100	0.012	0.010

### Úloha E4.03 Shluková analýza vodárenských dat

Data:

(a)  $E403A_i$  index vzorku,  $E403Ax1$  barva [mg Pt/l],  $E403Ax2$  zákal,  $E403Ax3$  vodivost [S/cm<sup>2</sup>],  $E403Ax4$  pH,  $E403Ax5$  VL [mg/l],  $E403Ax6$  chemická spotřeba kyslíku CHSK [mg/l],  $E403Ax7$  tvrdost [mmol/l],  $E403Ax8$  alkalita [mmol/l],  $E403Ax9$  obsah železa [mg/l].

$i$	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$
1	0.00	0.00	518	7.50	164	0.4	3.33	5.28	0.09
2	0.60	0.00	518	7.42	416	0.5	3.37	5.24	0.03
3	0.00	0.00	518	7.47	448	0.4	3.38	5.26	0.06
4	0.30	1.70	824	7.40	366	0.2	4.58	5.62	0.26
5	3.45	1.44	863	7.95	654	1.4	4.25	6.32	0.42
6	12.53	1.49	520	7.67	269	4.4	2.81	2.65	0.04
7	7.87	0.00	525	8.54	446	3.6	2.70	2.80	0.10
8	0.45	0.00	793	7.36	641	0.6	4.70	5.70	0.12
9	0.92	0.76	822	7.45	616	0.6	4.40	5.40	0.33
10	3.92	1.78	590	7.73	423	2.9	2.70	2.80	0.55
11	2.46	0.28	653	6.22	599	0.5	2.50	1.60	0.03
12	3.56	4.43	1934	7.16	1767	1.2	9.70	10.75	0.29
13	2.53	0.35	2031	7.51	1694	1.2	9.50	10.75	0.15
14	0.00	0.00	539	7.30	384	0.4	3.10	5.50	0.04
15	0.35	3.03	619	7.58	391	0.2	3.20	4.90	0.09
16	2.19	1.40	719	8.08	512	0.4	3.60	4.80	0.20
17	4.13	1.02	788	7.95	567	1.2	3.80	5.30	0.01
18	1.96	0.54	642	7.67	427	0.8	3.47	5.70	0.09
19	11.71	1.86	556	7.68	376	3.1	2.75	2.85	0.03
20	5.06	0.00	556	7.48	390	2.8	2.63	2.50	0.07
21	8.64	0.93	556	7.87	372	2.7	2.48	2.95	0.13
22	1.91	0.00	757	8.10	362	1.9	3.45	5.00	0.07
23	2.28	0.00	872	8.31	608	1.2	4.21	6.40	0.02
24	0.00	0.00	142	6.30	69	0.1	0.60	1.15	0.02
25	4.60	0.00	565	7.47	395	2.4	2.62	2.26	0.16
26	2.80	0.90	828	8.10	420	1.3	4.19	5.66	0.19
27	0.50	0.10	584	7.70	398	0.3	3.28	5.30	0.03
28	2.00	0.00	589	7.62	415	0.5	3.30	5.50	0.01
29	3.40	1.50	553	7.42	397	2.5	2.73	2.22	0.63
30	0.00	0.00	726	7.21	578	0.2	4.27	5.02	0.08
31	1.36	1.29	581	7.34	381	0.2	3.37	5.17	0.25
32	1.08	0.00	581	7.38	410	0.1	3.33	5.15	0.07

(b) Charakter proměnných:  $E403i$  číslo vzorku,  $B403Bx1$  obsah manganu [mg/l],  $B403Bx2$  obsah amonných iontů [mg/l],  $B403Bx3$  obsah chloridů [mg/l],  $B403Bx4$  obsah síranů [mg/l],  $B403Bx5$  obsah dusičnanů [mg/l],  $B403Bx6$  obsah saponátů [mg/l],  $B403Bx7$  obsah huminových látek [mg/l],  $B403Bx8$  absorbance,

$i$	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$
1	0.02	0.06	16.3	109.5	10.3	0.06	0.00	0.01
2	0.05	0.19	17.6	75.9	10.4	0.05	0.09	0.01
3	0.06	0.13	18.4	86.4	10.3	0.00	0.00	0.01
4	0.20	0.17	34.5	168.6	32.7	0.05	0.00	0.02
5	0.03	0.14	16.7	96.1	4.2	0.00	0.75	0.06
6	0.03	0.21	18.1	72.1	9.4	0.09	2.40	0.13
7	0.05	0.50	22.7	72.1	8.7	0.00	1.91	0.10
8	0.02	0.08	36.5	168.1	31.1	0.00	0.39	0.04
9	0.27	0.02	30.1	170.5	31.5	0.02	0.25	0.05
10	0.05	0.13	26.2	132.1	9.4	0.00	1.04	0.14
11	0.03	0.00	51.0	168.1	36.4	0.01	2.30	0.05
12	0.46	0.18	93.6	614.8	35.1	0.02	0.41	0.07
13	0.24	0.13	103.0	629.2	35.3	0.09	0.32	0.08
14	0.01	0.00	13.8	57.6	11.3	0.00	0.10	0.04
15	0.04	0.00	15.6	57.6	10.7	0.00	0.08	0.04

16	0.02	0.03	23.4	160.9	3.7	0.00	0.20	0.06
17	0.00	0.00	16.7	194.5	4.7	0.00	0.40	0.06
18	0.00	0.28	21.3	91.2	12.5	0.05	2.80	0.01
19	0.12	0.50	27.3	134.5	7.93	0.08	3.30	0.11
20	0.04	0.45	24.8	163.3	7.66	0.01	0.90	0.06
21	0.06	0.39	25.2	146.5	7.72	0.05	0.40	0.08
22	0.06	0.35	22.7	173.8	3.04	0.00	1.10	0.03
23	0.05	0.47	18.4	211.3	2.84	0.11	4.60	0.03
24	0.00	0.03	8.5	4.8	5.46	0.00	0.00	0.01
25	0.07	0.39	24.4	160.4	7.60	0.00	0.69	0.09
26	0.09	0.46	17.6	215.2	4.20	0.00	0.50	0.06
27	0.04	0.24	17.7	64.4	8.80	0.00	0.75	0.10
28	0.01	0.20	15.2	59.6	9.50	0.00	1.69	0.02
29	0.04	0.02	25.9	151.3	7.21	0.02	0.58	0.09
30	0.06	0.10	28.0	140.7	21.55	0.00	0.00	0.01
31	0.05	0.04	14.2	68.2	8.68	0.01	0.40	0.01
32	0.06	0.05	13.8	91.2	9.59	0.05	0.00	0.00

#### Úloha E4.04 Klasifikace zdrojů pitné vody

Data: E404i index vzorku, E404x1 obsah dusičnanů [mg/l], E404x2 obsah dusitanů [mg/l], E404x3 obsah chloridů [mg/l], E404x4 obsah celkového chloru [mg/l], E404x5 obsah síranů [mg/l], E404x6 obsah fosforečnanů [mg/l], E404x7 obsah amonných solí [mg/l], E404x8 obsah vápníku [mg/l], E404x9 obsah hořčíku [mg/l], E404x10 obsah železa (celkového) [mg/l], E404x11 obsah manganu [mg/l], E404x12 pH, E404x13 KNK, E404x14 ZNK, E404x15 vodivost, E404x16 nerozpuštěné látky [mg/l],

i	x <sub>1</sub>	x <sub>2</sub>	x <sub>3</sub>	x <sub>4</sub>	x <sub>5</sub>	x <sub>6</sub>	x <sub>7</sub>	x <sub>8</sub>	x <sub>9</sub>	x <sub>10</sub>	x <sub>11</sub>	x <sub>12</sub>	x <sub>13</sub>	x <sub>14</sub>	x <sub>15</sub>	x <sub>16</sub>
1	2.2	0.00	6.	6.	103.5	0.032	0.02	181	17	0.016	0.05	7.08	8.1	3.40	855	0.09
2	1.9	0.01	18.	18.	127.0	0.032	0.06	161	19	0.016	0.05	7.22	6.0	1.80	706	0.08
3	1.3	0.01	1.	1.	93.5	0.032	0.04	175	14	0.016	0.05	7.16	9.3	2.10	625	0.56
4	1.5	0.02	80.	80.	291.0	0.032	0.02	310	38	0.016	0.05	7.07	9.7	5.05	1465	0.06
5	1.7	0.01	93.	93.	321.0	0.032	0.02	316	51	0.016	0.05	7.13	10.5	4.85	1526	0.03
6	11.8	0.11	51.	51.	127.0	0.032	0.02	129	24	0.016	0.10	7.21	4.7	1.35	752	0.07
7	1.6	0.05	28.	28.	281.0	0.044	0.02	179	65	1.050	0.10	7.21	8.1	2.45	1081	0.27
8	2.5	0.10	11.	11.	49.0	0.189	0.22	83	10	0.016	0.11	7.21	4.6	0.55	437	0.20
9	4.8	0.11	12.	12.	51.0	0.044	0.06	47	22	0.071	0.14	7.74	3.7	0.60	380	0.10
10	8.4	0.04	13.	13.	84.0	0.032	0.02	94	5	0.016	0.05	7.51	3.7	0.55	414	0.32
11	1.0	0.01	7.	7.	150.0	0.032	1.89	159	13	0.016	0.67	7.29	6.6	2.05	686	0.13
12	11.4	0.56	23.	23.	132.0	0.032	0.05	85	13	0.016	0.07	7.32	3.5	0.45	464	0.12
13	9.0	0.11	14.	14.	79.5	0.164	0.02	88	24	0.016	0.07	7.42	5.1	0.75	475	0.13
14	27.7	0.03	57.	57.	168.0	0.063	0.02	200	13	0.016	0.08	7.37	6.6	1.25	920	0.26
15	54.2	0.02	52.	52.	139.0	0.095	0.03	190	7	0.038	0.06	7.36	6.9	1.15	982	0.36
16	69.9	0.04	38.	38.	72.0	0.101	0.44	171	2	0.016	0.05	7.29	6.8	1.70	913	0.13
17	3.5	0.08	13.	13.	110.5	0.145	0.02	88	12	0.016	0.05	7.41	3.3	0.65	491	0.15
18	1.0	0.02	16	7.16	7.31	0.095	0.20	34	19	0.038	0.17	7.12	9.6	2.90	1614	0.19
19	1.0	0.00	87.	87.	144.0	0.032	0.31	145	45	0.053	0.05	7.62	7.8	1.10	924	0.15
20	13.2	0.01	15.	15.	50.0	0.139	0.06	94	5	0.016	0.06	7.72	4.8	0.70	491	0.17
21	1.0	0.04	45.	45.	68.0	0.076	0.28	122	3	0.018	3.66	7.19	3.4	0.85	541	0.11
22	18.4	0.02	24.	24.	127.0	0.032	0.02	137	5	0.016	0.09	7.49	5.3	1.40	610	0.10
23	12.8	0.00	15.	15.	124.0	0.032	0.02	120	6	0.016	0.05	7.59	4.5	0.55	518	0.18
24	19.9	0.03	43.	43.	187.0	0.032	0.02	183	2	0.025	0.05	7.48	5.1	1.60	882	0.11
25	33.7	0.03	9.	9.	101.0	0.032	0.02	96	6	0.016	0.05	7.65	2.7	0.75	429	0.09
26	1.3	0.05	23.	23.	243.0	0.032	0.23	161	13	0.064	1.05	7.18	2.8	1.10	686	0.12
27	1.0	0.00	16.	16.	137.0	0.032	0.02	147	7	0.016	0.26	7.51	5.7	1.30	648	0.10
28	2.1	0.03	16.	16.	130.0	0.032	0.04	155	6	0.016	0.32	7.53	5.7	1.05	660	0.10
29	1.0	0.02	7.	7.	163.0	0.032	0.78	149	9	0.025	3.05	7.31	6.1	2.20	637	0.09
30	1.0	0.00	4.	4.	72.0	0.032	0.21	88	9	0.016	0.18	7.62	4.3	0.55	414	0.11
31	1.3	0.00	57.	57.	116.0	0.044	0.13	130	58	0.066	0.05	7.48	10.9	2.05	908	0.21
32	1.0	0.00	30.	30.	48.0	0.391	0.02	168	5	0.054	0.05	8.03	7.6	1.75	672	0.09
33	1.4	0.00	46.	46.	94.0	0.032	0.02	86	54	0.066	0.05	7.79	5.5	1.10	711	0.23
34	22.6	0.00	53.	53.	58.0	0.032	0.02	105	58	0.061	0.05	7.55	6.5	1.85	729	0.11
35	21.2	0.00	45.	45.	106.0	0.032	0.02	100	72	0.064	0.05	7.72	6.8	1.40	790	0.09
36	30.2	0.00	59.	59.	238.0	0.032	0.02	154	83	0.084	0.05	7.70	6.3	1.30	1101	0.09
37	39.0	0.00	22.	22.	90.0	0.038	0.02	88	11	0.061	0.05	7.72	3.8	1.05	432	0.09
38	11.0	0.00	11.	11.	82.0	0.032	0.02	90	22	0.056	0.05	7.71	7.0	1.60	629	0.05
39	25.0	0.00	20.	20.	96.5	0.032	0.03	90	35	0.016	0.05	7.65	5.8	1.15	551	0.15
40	2.2	0.00	34.	34.	82.0	0.032	0.10	130	12	0.016	0.05	7.84	5.7	1.15	575	0.08

41	33.6	0.01	45.	45.	115.0	0.032	0.02	160	6	0.028	0.12	7.77	4.1	1.05	679	0.07
42	46.5	0.01	11.	11.	81.5	0.543	0.10	80	9	0.016	0.05	7.73	3.1	0.75	432	0.06
43	39.3	0.04	28.	28.	130.5	0.032	0.19	144	15	0.031	0.08	7.68	5.5	1.15	615	0.11
44	14.7	0.00	29.	29.	92.5	0.032	0.02	122	24	0.084	0.05	7.78	6.1	1.05	575	0.07
45	17.6	0.00	33.	33.	132.0	0.032	0.02	128	18	0.036	0.07	7.81	4.1	0.60	551	0.04
46	42.8	0.15	25.	25.	149.0	0.032	0.02	152	6	0.076	0.12	7.64	3.8	0.95	665	0.05
47	18.4	0.27	15.	15.	45.5	0.032	0.02	70	5	0.089	0.08	7.50	3.2	0.95	369	0.07
48	7.4	0.01	14.	14.	195.0	0.032	0.02	148	9	0.051	0.13	7.46	3.9	1.30	657	0.08
49	22.1	0.19	52.	52.	180.0	0.032	0.02	154	15	0.048	0.06	7.73	5.6	1.60	803	0.07
50	1.9	0.00	11.	11.	58.0	0.032	0.02	146	11	0.028	0.05	7.84	4.3	1.00	425	0.08
51	18.3	0.00	7.	7.	65.5	0.032	0.02	98	12	0.043	0.05	7.59	4.3	1.25	398	0.07
52	20.8	0.29	36.	36.	65.5	0.032	0.03	120	18	0.084	0.05	7.50	5.7	1.70	592	0.07
53	9.0	0.00	24.	24.	125.0	0.032	0.02	122	7	0.079	0.05	7.77	4.4	1.50	511	0.07
54	19.4	0.00	22.	22.	108.0	0.032	0.02	120	5	0.041	0.05	7.95	5.1	1.65	548	0.03
55	1.8	0.00	3.	3.	92.0	0.032	0.02	118	15	0.056	0.05	7.84	6.4	1.90	504	0.06
56	31.1	0.01	1.	1.	125.0	0.032	0.02	138	24	0.097	0.05	7.71	6.2	1.60	628	0.06
57	21.9	0.83	31.	31.	76.0	1.740	0.02	104	4	0.102	0.09	6.67	5.7	1.55	613	0.06
58	6.9	0.31	36.	36.	50.5	4.420	0.02	120	7	0.079	0.22	7.69	6.2	3.10	635	0.03
59	13.9	0.15	60.	60.	81.0	0.110	0.02	151	9	0.066	0.05	7.96	5.4	0.85	1217	0.66
60	7.4	0.17	56.	56.	151.0	0.177	0.02	149	19	0.016	0.18	7.61	5.6	0.85	790	0.13
61	1.0	0.07	29.	29.	68.5	0.164	0.02	81	11	0.041	0.05	7.62	4.5	0.75	441	0.00
62	32.8	0.01	25.	25.	115.5	0.050	0.02	102	12	0.016	0.05	7.69	2.6	0.65	436	0.05

#### Úloha E4.05 Porovnání a hodnocení mycích procesů v laboratoři (EDA, PCA, CLU)

Data: E406x1 až E406x13 představují číslo přípravku, kód omyvatelnosti, a hodnocení umytí ve škále 1 až 5 pro všechny testované mycí postupy  $x_1$  až  $x_{12}$ .

E405x1	E405x2	H <sub>2</sub> O				HNO <sub>3</sub>		NaOH		DETERGENTY			
		A	B	C	D	E	F	G	H	CH	I	J	
1	+	2	1	1	1	3	3	2	1	2	1	1	
2	++	4	2	2	1	3	3	3	1	2	1	1	
3	++	4	2	1	1	3	3	3	1	2	1	1	
4	++	4	2	2	1	3	3	4	1	3	1	1	
5	-	4	2	1	1	4	4	3	2	2	1	1	
6	-	4	3	2	2	3	3	3	2	2	1	1	
7	-	4	2	2	2	4	3	3	2	2	2	1	
8	-	4	4	3	3	4	3	3	1	1	1	2	
9	-	4	3	2	2	4	3	3	1	1	1	2	
10	++	3	2	2	1	3	3	2	1	1	1	1	
11	++	2	2	2	2	2	2	2	1	2	1	1	
12	++	4	3	3	1	4	4	2	1	2	1	1	
13	-	4	3	2	2	4	3	2	1	2	1	1	

### Úloha E4.06 Průzkumová analýza a klasifikace vlastností rozličných druhů kávy (EDA, PCA, CLU)

Data: Soubor dat COFFEE obsahuje na 43 vzorcích kávy (řádky) popis pomocí 13 proměnných (sloupce) v pořadí:  $E406i$  index kávy,  $E406j$  je původ kávy,  $E406x1$  obsah vody,  $E406x2$  hmotnost zrn,  $E406x3$  extrakt,  $E406x4$  pH,  $E406x5$  volná acidita,  $E406x6$  obsah minerálů,  $E406x7$  tuky,  $E406x8$  kofein,  $E406x9$  trinonelin,  $E406x10$  kyselina chlorogeniková,  $E406x11$  kyselina neochlorogeniková,  $E406x12$  kyseliny isochlorogeniková,  $E406x13$  suma kyselin chlorogenikových.

$i$	$j$	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$	$x_{10}$	$x_{11}$	$x_{12}$	$x_{13}$
1	Mexico 1	8.9	156.6	33.5	5.8	32.7	3.8	15.2	1.1	1.0	5.4	0.4	0.8	6.6
2	Mexico 2	7.4	157.3	32.1	5.8	30.8	3.7	15.0	1.3	1.0	5.1	0.3	1.0	6.4
3	Guatemala	9.7	152.9	33.1	5.3	36.7	4.2	16.1	1.2	1.0	5.9	0.2	0.8	6.9
4	Honduras	10.4	174.0	31.5	5.6	34.2	3.9	15.8	1.1	0.9	5.9	0.4	0.6	6.8
5	Salvador 1	10.5	145.1	35.2	5.8	31.8	4.1	15.2	1.1	1.0	5.1	0.5	0.7	6.3
6	Salvador 2	10.0	156.4	34.5	5.8	32.6	3.9	15.4	1.2	0.8	5.3	0.4	0.7	6.4
7	Salvador 3	8.2	155.2	32.4	5.6	29.7	3.8	15.6	1.3	1.2	4.8	0.3	0.7	5.9
8	Nicaragua 1	9.2	167.8	30.6	5.9	28.9	3.8	15.1	1.3	1.0	5.0	0.3	0.7	5.9
9	Nicaragua 2	9.3	165.4	35.3	5.8	32.6	4.2	14.3	1.2	1.0	5.5	0.4	0.8	6.7
10	Costa Rica 1	7.1	180.3	33.0	5.8	29.3	4.0	15.1	1.3	1.0	5.1	0.3	0.7	6.1
11	Costa Rica 2	7.6	153.2	36.0	5.9	30.5	3.9	16.8	1.4	1.1	5.3	0.3	0.7	6.3
12	Costa Rica 3	7.3	159.6	35.0	5.8	29.9	3.7	16.5	1.2	1.2	5.5	0.3	0.7	6.5
13	Panama	9.3	161.8	32.4	5.8	31.0	3.7	15.5	1.3	1.2	5.6	0.3	0.6	6.6
14	Haiti	8.3	160.8	35.7	5.9	30.0	4.4	13.0	1.3	1.0	6.1	0.6	0.8	7.5
15	Dominica	11.6	174.8	32.5	5.4	35.2	3.7	14.5	1.0	1.0	5.7	0.3	0.5	6.5
16	Venezuela 1	9.7	169.1	34.0	5.8	31.6	4.0	15.7	1.3	1.3	5.1	0.3	0.3	6.2
17	Venezuela 2	10.6	163.7	35.0	5.8	35.0	3.8	15.8	1.2	1.1	6.1	0.3	0.9	7.3
18	Columbia 1	12.0	178.8	32.9	5.3	36.2	4.4	15.6	1.3	1.0	5.6	0.4	0.7	6.7
19	Columbia 2	10.6	169.1	33.0	5.3	37.5	4.4	15.1	1.2	1.0	6.1	0.1	0.6	6.9
20	Ecuador	11.6	148.5	34.6	5.3	39.4	4.2	14.6	1.0	1.1	5.7	0.5	0.4	6.6
21	Peru	10.1	153.7	34.5	6.0	28.4	3.7	15.9	1.3	1.1	6.1	0.4	0.8	7.3
22	Brasil 1	10.7	134.5	29.8	5.4	34.1	3.7	15.8	1.2	0.9	5.4	0.4	0.6	6.4
23	Brasil 2	9.7	160.7	33.8	5.3	37.2	4.2	15.2	1.1	0.9	5.4	0.3	0.5	6.2
24	Brasil 3	10.8	133.2	35.0	5.2	34.7	4.5	15.1	1.2	1.4	5.0	0.5	0.5	6.0
25	Brasil 4	11.1	131.7	29.8	5.4	33.0	4.1	15.8	1.1	1.2	5.1	0.5	0.5	6.0
26	Brasil 5	10.1	121.6	33.6	5.4	34.7	3.5	15.4	1.1	0.9	5.5	0.4	0.6	6.5
27	Cotedivoir	8.0	141.8	33.7	5.8	41.9	4.2	11.0	2.0	0.5	6.4	0.6	1.5	8.5
28	Togo	9.0	144.6	29.9	5.6	38.0	3.9	7.5	1.9	0.3	5.4	0.8	0.9	7.1
29	Cameroon	10.3	119.2	35.5	6.1	41.7	4.1	9.8	1.8	0.8	6.0	0.5	1.1	7.6
30	Congo	10.0	143.2	31.7	6.1	29.3	4.1	17.0	1.2	0.6	5.4	0.3	0.7	6.4
31	Angola 1	9.2	150.4	31.5	5.7	36.4	4.2	8.5	1.9	0.6	5.9	0.6	1.4	7.9
32	Angola 2	9.6	136.6	33.9	5.6	38.2	4.0	7.2	2.2	0.5	6.2	0.4	1.6	8.3
33	Angola 3	9.5	136.5	32.0	5.8	31.2	3.8	14.6	1.3	1.0	5.2	0.4	0.8	6.4
34	Ethiopie	9.3	124.2	35.6	5.8	31.8	3.8	15.7	0.9	0.9	5.5	0.2	0.8	6.5
35	Uganda 1	10.5	132.9	36.2	5.4	36.7	4.0	15.6	1.0	1.0	5.9	0.4	0.6	6.9
36	Uganda 2	10.7	181.2	33.1	5.8	30.7	3.9	15.8	1.3	1.1	5.3	0.3	0.6	6.2
37	Kenya	10.5	159.1	30.3	5.6	31.5	3.7	15.2	1.3	0.9	5.1	0.3	0.7	6.0
38	Tanganika	9.9	169.4	29.0	5.6	30.2	3.7	16.5	1.3	0.9	5.0	0.2	0.7	5.9
39	Madagascar	5.0	152.0	30.6	5.3	40.5	3.9	9.6	1.6	0.7	5.3	0.6	0.8	6.7
40	India	11.5	156.8	30.8	5.5	37.5	3.9	14.3	1.2	1.0	5.8	0.4	0.4	6.6
41	Sumatra	8.4	110.8	31.6	5.7	43.4	4.5	10.1	1.7	0.8	6.3	0.7	0.9	7.9
42	Java	5.6	163.1	34.5	5.5	33.3	4.0	16.0	1.2	1.1	5.1	0.3	0.8	6.3
43	Hawai	9.7	191.2	35.1	5.6	34.6	4.2	14.2	1.1	0.9	0.7	0.5	0.3	6.5



### Úloha E4.07 Průzkumová analýza dat o znečištění ovzduší (EDA, PCA, CLU, LDA)

Data: E407i index místa, E407x1 až E407x10 představují 10 proměnných ke sledování znečištění, 20 vyšetřovaných míst ve městě (řádky).

Objekt <i>i</i>	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$	$x_{10}$
1	18.6	18.3	8.1	22.8	16.0	37.6	24.8	11.8	28.3	29.4
2	15.0	24.6	7.5	20.2	18.4	38.1	25.5	16.0	33.4	34.4
3	20.4	30.6	8.2	25.1	21.5	52.9	36.6	20.7	38.9	41.4
4	18.3	29.8	8.3	21.9	18.5	46.5	35.2	13.2	34.4	33.5
5	22.8	21.9	7.2	27.7	15.6	44.3	28.3	17.3	32.9	38.7
6	6.7	11.6	3.6	5.8	7.7	14.3	6.6	7.4	9.1	10.7
7	26.2	30.5	9.3	28.0	22.9	58.6	41.3	20.3	47.1	44.2
8	7.4	11.1	3.01	8.7	12.4	19.4	16.8	8.9	21.1	21.0
9	26.7	26.0	11.8	34.4	18.5	53.4	31.1	20.1	29.9	38.7
10	16.6	12.0	9.7	25.1	5.4	34.1	15.2	18.7	14.5	23.6
11	13.8	27.8	5.2	14.4	23.0	37.9	27.3	10.2	34.0	31.2
12	28.2	31.8	9.9	29.1	19.9	54.6	40.7	22.3	38.0	45.9
13	19.3	21.6	12.0	30.2	13.9	44.0	27.7	20.3	24.8	36.7
14	17.9	18.4	5.7	27.6	16.8	39.8	21.3	18.1	22.2	34.7
15	17.8	25.2	7.9	21.7	17.4	38.7	28.1	11.2	31.1	32.2
16	15.6	19.1	8.3	24.8	13.7	37.0	26.2	17.4	29.4	28.7
17	22.3	25.7	8.2	23.1	22.5	40.1	31.4	12.7	32.4	36.9
18	14.8	12.6	9.4	28.6	11.1	34.6	16.7	17.6	17.2	25.4
19	16.0	26.4	5.6	13.5	19.3	31.6	23.5	10.7	36.3	27.1
20	18.2	16.3	5.2	23.3	13.9	29.0	21.8	14.3	22.5	22.6
Zdroj										
A	35.0	40.0	60.0	75.0	40.0	30.0	55.0	50.0	80.0	40.0
B	40.0	20.0	20.0	70.0	20.0	80.0	40.0	50.0	30.0	60.0
C	20.0	60.0	55.0	80.0	10.0	45.0	75.0	30.0	70.0	20.0
D	30.0	65.0	10.0	20.0	45.0	75.0	65.0	15.0	85.0	65.0

### Úloha E4.08 Faktorová analýza při klasifikaci vzorků vín (EDA, PCA, CLU)

Data: E408i index vzorku vína, E408j jméno vzorku vína, E408k kategorie vzorku vína. Data obsahují 90 druhů vín (objekty, řádky) tří kategorií 1. Barolo, 2. Grignolino a 3. Barbera, popsaných 8 následujícími vlastnostmi (proměnné, sloupce): E408x1 obsah alkoholu, E408x2 necukerný extrakt, E408x3 fosfáty, E408x4 celkové fenoly, E408x5 flavanoidy, E408x6 poměr absorbcí při 280 a 315 nm pro naředěné víno, E408x7 poměr absorbcí při 280 a 315 nm pro flavanoidy, E408x8 obsah prolinu.

E408i	E408j	E408k	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$
1	Olo0171	1	14.23	24.82	320	2.80	3.06	3.92	4.77	1065
2	Olo0371	1	13.16	26.30	497	2.80	3.24	3.17	3.46	1185
3	Olo0571	1	13.24	26.05	408	2.80	2.69	2.93	3.22	735
4	Olo0771	1	14.39	27.02	306	2.50	2.52	3.58	3.94	1290
5	Olo0971	1	14.83	26.80	440	2.80	2.98	2.85	3.03	1045
6	Olo1171	1	14.10	26.08	399	2.95	3.32	3.17	3.27	1510
7	Olo1371	1	13.75	30.25	453	2.60	2.76	2.90	2.92	1320
8	Olo1571	1	14.38	27.10	523	3.30	3.64	3.00	3.32	1547
9	Olo1771	1	14.30	27.90	513	2.80	3.14	2.65	3.10	1280
10	Olo1971	1	14.19	26.40	488	3.30	3.93	2.82	3.17	1680
11	Olo0273	1	14.06	25.32	323	3.00	3.17	3.71	3.75	780
12	Olo0473	1	13.71	27.63	476	2.61	2.88	4.00	4.31	1035
13	Olo0673	1	13.50	25.00	476	2.53	2.61	3.82	4.00	845
14	Olo0873	1	13.39	27.10	395	2.85	2.94	3.22	4.44	1195
15	Olo1073	1	13.87	29.30	396	2.95	2.97	3.40	3.72	915
16	Olo1273	1	13.73	26.75	436	3.00	3.25	2.71	3.00	1285
17	Olo1473	1	13.68	26.98	398	2.42	2.69	2.87	3.04	990
18	Olo1673	1	13.51	26.22	464	2.35	2.53	2.87	2.91	1095
19	Olo1873	1	13.28	29.70	431	2.60	2.68	2.78	3.17	880
20	Olo2073	1	13.07	24.30	386	2.40	2.64	2.69	3.04	1020
21	Olo0274	1	13.56	26.60	316	3.15	3.29	3.38	3.53	795
22	Olo0474	1	13.88	27.80	502	3.25	3.56	3.56	4.00	1095
23	Olo0674	1	13.05	23.70	408	3.00	3.00	3.35	3.78	885
24	Olo0874	1	14.38	30.70	408	3.25	3.17	3.44	3.56	1065
25	Olo1074	1	14.10	25.98	480	2.75	2.92	2.75	2.89	1060
26	Olo1274	1	13.05	24.30	638	2.72	3.27	2.91	3.20	1150
27	Olo1474	1	13.82	26.25	472	3.88	3.74	3.26	3.53	1190

28	Olo1674	1	13.74	24.80	502	2.60	2.90	3.20	3.36	1060
29	Olo1874	1	14.22	26.60	465	3.20	3.00	3.31	3.81	970
30	Olo2074	1	13.72	27.10	403	3.40	3.67	2.87	3.10	1285
31	Gri0270	2	12.33	22.90	365	2.05	1.09	1.67	1.42	680
32	Gri0470	2	13.67	22.20	301	2.10	1.79	2.46	1.73	630
33	Gri0670	2	12.17	23.03	411	1.89	1.75	2.23	2.73	355
34	Gri0970	2	12.37	20.90	212	2.11	2.00	3.48	4.07	510
35	Gri0271	2	12.21	22.70	448	1.85	1.28	3.07	3.23	718
36	Gri0471	2	13.86	25.25	383	2.95	2.86	3.16	3.52	410
37	Gri0671	2	12.99	26.10	473	3.30	2.89	3.50	3.60	985
38	Gri0971	2	13.03	23.50	396	1.95	2.03	2.48	2.85	392
39	Gri0272	2	12.33	20.60	438	1.90	1.85	2.31	2.70	750
40	Gri0472	2	12.00	23.20	408	2.42	2.26	3.12	3.52	278
41	Gri0672	2	12.08	23.50	215	2.00	1.58	2.72	3.50	630
42	Gri0173	2	11.84	23.40	378	2.20	2.21	3.08	3.81	520
43	Gri0373	2	12.16	25.80	285	1.78	1.69	2.26	2.92	495
44	Gri0673	2	12.08	24.00	278	2.20	1.59	3.21	3.77	625
45	Gri0873	2	12.00	25.30	342	1.45	1.25	2.65	2.75	450
46	Gri0174	2	12.29	25.00	329	2.45	2.25	3.30	3.75	290
47	Gri0374	2	12.47	24.95	464	2.50	2.27	2.63	2.99	937
48	Gri0574	2	12.29	25.30	440	2.55	2.50	2.74	3.14	428
49	Gri0874	2	12.08	22.90	212	2.23	2.17	2.96	3.41	710
50	Gri1074	2	12.34	25.80	146	2.56	2.11	3.38	4.19	438
51	Gri1274	2	12.51	24.50	254	2.20	1.92	3.57	4.50	672
52	Gri1474	2	12.25	25.00	265	1.65	2.03	3.17	4.16	510
53	Gri0175	2	11.61	27.60	408	2.74	2.92	3.26	3.85	680
54	Gri0375	2	12.52	26.53	339	2.55	2.27	2.78	3.10	325
55	Gri0575	2	11.41	21.70	315	2.48	2.01	2.31	4.16	434
56	Gri0775	2	11.03	23.30	358	2.46	2.17	2.87	3.46	407
57	Gri0975	2	12.42	25.30	268	2.00	2.09	2.96	3.73	345
58	Gri0376	2	11.45	24.30	262	2.90	2.79	3.39	4.27	625
59	Gri0576	2	12.42	25.00	524	2.20	2.13	3.12	4.33	365
60	Gri0776	2	11.87	27.35	300	2.86	3.03	3.64	4.50	380
61	Era0174	3	12.86	26.80	266	1.51	1.25	1.29	1.26	630
62	Era0374	3	12.81	24.45	266	1.15	1.09	1.36	1.24	560
63	Era0474	3	12.70	24.75	356	1.70	1.20	1.29	1.23	600
64	Era0674	3	12.60	23.60	275	1.62	0.66	1.58	1.37	695
65	Era0874	3	12.53	27.10	360	1.79	0.60	1.69	1.80	515
66	Era0974	3	13.49	25.70	315	1.62	0.38	1.82	2.23	580
67	Era0276	3	12.93	26.78	351	1.54	0.50	2.31	2.34	600
68	Era0376	3	13.36	24.12	235	1.40	0.50	2.47	2.60	780
69	Era0576	3	13.62	25.52	191	2.00	0.80	2.05	2.55	550
70	Era0179	3	12.25	23.40	358	1.38	0.78	2.00	2.23	885
71	Era0379	3	13.88	21.40	171	0.98	0.34	1.33	1.81	415
72	Era0479	3	12.87	24.45	366	1.70	0.65	1.86	2.10	625
73	Era0178	3	13.08	26.80	303	1.41	1.39	1.33	1.26	550
74	Era0278	3	13.50	26.50	338	1.40	1.57	1.30	1.29	500
75	Era0478	3	13.11	25.20	289	2.20	1.28	1.33	1.25	425
76	Era0578	3	13.23	23.85	351	1.80	0.83	1.51	1.42	675
77	Era0778	3	13.17	23.20	241	1.74	0.63	1.48	1.31	725
78	Era0878	3	13.84	24.70	402	1.80	0.83	1.64	1.92	480
79	Era1078	3	14.34	29.10	462	2.80	1.31	1.96	2.25	660
80	Era1178	3	13.48	26.95	480	2.60	1.10	1.78	2.09	620
81	Era1378	3	13.69	24.80	394	1.83	0.56	1.82	2.61	680
82	Era1478	3	12.85	25.70	318	1.65	0.60	2.11	2.77	570
83	Era1678	3	13.78	25.10	417	1.35	0.68	1.68	2.05	615
84	Era1778	3	13.73	24.65	360	1.28	0.47	1.75	2.15	520
85	Era1978	3	12.82	22.40	308	1.48	0.66	1.75	1.90	685
86	Era2078	3	13.58	27.20	369	1.55	0.84	1.80	1.96	750
87	Era2278	3	12.20	23.70	265	1.25	0.49	1.83	2.80	510
88	Era2478	3	14.16	23.82	319	1.68	0.70	1.71	1.90	660

89	Era2678	3	13.40	24.60	490	1.80	0.75	1.56	1.93	750
90	Era2878	3	13.17	23.45	534	1.65	0.68	1.62	2.05	840

#### Úloha E4.09 Klasifikace čistého mléka dle složení z různých komponent (EDA, PCA, CLU)

Data:  $E409i$  index vzorku tuku mléka,  $E409p$  je třída druhu mléka, procento tří mastných kyselin  $E409x1 = FA1$  [%],  $E409x2 = FA2$  [%],  $E409x3 = FA3$  [%] v 17 vzorcích mléčného tuku (řádky)

$E409i$	$E409p$	$x_1 = FA1$	$x_2 = FA2$	$x_3 = FA3$
1	1	3.5	12.8	8.9
2	1	2.5	8.3	11.0
3	1	2.7	6.0	11.5
4	1	4.1	6.8	12.5
5	1	3.8	8.9	9.8
6	1	1.5	9.6	8.8
7	1	6.5	11.2	9.0
8	2	4.3	7.8	11.0
9	2	4.8	5.4	10.4
10	2	5.4	5.7	12.0
11	2	4.1	5.0	11.3
12	2	4.5	5.8	11.7
13	2	5.0	6.5	9.4
14	2	4.9	4.5	12.6
15	0	1.0	2.5	14.5
16	0	2.9	7.8	12.2
17	0	3.8	5.5	13.2

#### Úloha E4.10 Faktory ovlivňující výnosnost petržele (EDA, PCA, CLU)

Data:  $E410i$  je index druhu petržele,  $E410x_1$  průměr květu rostliny,  $E410x_2$  výška rostliny,  $E410x_3$  šířka rostliny,  $E410x_4$  výnos semena na jednu rostlinu.

$E410i$	$E410x_1$	$E410x_2$	$E410x_3$	$E410x_4$
1	4.5	7.0	15.0	0.190
2	5.0	8.0	20.0	0.347
3	5.0	8.0	20.0	0.473
4	4.5	7.0	17.0	0.341
5	4.8	7.5	23.0	0.156
6	5.2	8.0	18.0	0.290
7	5.2	7.5	17.0	0.574
8	4.5	7.5	22.0	0.214
9	4.5	8.0	17.0	0.184
10	4.5	8.0	17.0	0.348
11	5.4	9.0	19.0	0.522
12	5.0	9.5	19.0	0.246
13	4.5	8.0	19.5	0.827
14	5.5	9.5	15.0	0.480

**Úloha E4.11** *Struktura a vazby proměnných při sledování kvality životního prostředí (EDA, PCA, CLU)*

*Data:*  $E411i$  index dne, ve kterém bylo měřeno,  $E411x1$  rychlost větru,  $E411x2$  sluneční záření,  $E411x3$  obsah CO,  $E411x4$  obsah NO,  $E411x5$  obsah NO<sub>2</sub>,  $E411x6$  obsah O<sub>3</sub>,  $E411x7$  obsah CH.

$E411i$	$E411x1$	$E411x2$	$E411x3$	$E411x4$	$E411x5$	$E411x6$	$E411x7$
1	8.0	98.0	7.0	2.0	12.0	8.0	2.0
2	7.0	107.0	4.0	3.0	9.0	5.0	3.0
3	7.0	103.0	4.0	3.0	5.0	6.0	3.0
4	10.0	88.0	5.0	2.0	8.0	15.0	4.0
5	6.0	91.0	4.0	2.0	8.0	10.0	3.0
6	8.0	90.0	5.0	2.0	12.0	12.0	4.0
7	9.0	84.0	7.0	4.0	12.0	15.0	5.0
8	5.0	72.0	6.0	4.0	21.0	14.0	4.0
9	7.0	82.0	5.0	1.0	11.0	11.0	3.0
10	8.0	64.0	5.0	2.0	13.0	9.0	4.0
11	6.0	71.0	5.0	4.0	10.0	3.0	3.0
12	6.0	91.0	4.0	2.0	12.0	7.0	3.0
13	7.0	72.0	7.0	4.0	18.0	10.0	3.0
14	10.0	70.0	4.0	2.0	11.0	7.0	3.0
15	10.0	72.0	4.0	1.0	8.0	10.0	3.0
16	9.0	77.0	4.0	1.0	9.0	10.0	3.0
17	8.0	76.0	4.0	1.0	7.0	7.0	3.0
18	8.0	71.0	5.0	3.0	16.0	4.0	4.0
19	9.0	67.0	4.0	2.0	13.0	2.0	3.0
20	9.0	69.0	3.0	3.0	9.0	5.0	3.0
21	10.0	62.0	5.0	3.0	14.0	4.0	4.0
22	9.0	88.0	4.0	2.0	7.0	6.0	3.0
23	8.0	80.0	4.0	2.0	13.0	11.0	4.0
24	5.0	30.0	3.0	3.0	5.0	2.0	3.0
25	6.0	83.0	5.0	1.0	10.0	23.0	4.0
26	8.0	84.0	3.0	2.0	7.0	6.0	3.0
27	6.0	78.0	4.0	2.0	11.0	11.0	3.0
28	8.0	79.0	2.0	1.0	7.0	10.0	3.0
29	6.0	62.0	4.0	3.0	9.0	8.0	3.0
30	10.0	37.0	3.0	1.0	7.0	2.0	3.0
31	8.0	71.0	4.0	1.0	10.0	7.0	3.0
32	7.0	52.0	4.0	1.0	12.0	8.0	4.0
33	5.0	48.0	6.0	5.0	8.0	4.0	3.0
34	6.0	75.0	4.0	1.0	10.0	24.0	3.0
35	10.0	35.0	4.0	1.0	6.0	9.0	2.0
36	8.0	85.0	4.0	1.0	9.0	10.0	2.0
37	5.0	86.0	3.0	1.0	6.0	12.0	2.0
38	5.0	86.0	7.0	2.0	13.0	18.0	2.0
39	7.0	79.0	7.0	4.0	9.0	25.0	3.0
40	7.0	79.0	5.0	2.0	8.0	6.0	2.0
41	6.0	68.0	6.0	2.0	11.0	14.0	3.0
42	8.0	40.0	4.0	3.0	6.0	5.0	2.0

### Úloha E4.12 Podobnost vlastností křupavých lupínků od různých výrobců (EDA, PCA, CLU)

Data: E412i index obilných lupínků, E412x1 výrobce, E412x3 kód výrobce G, K či Q, E412x3 kalorická hodnota [cal], E412x4 bílkoviny, E412x5 tuk, E412x6 sodné kationty, E412x7 vláknina, E412x8 uhlovodíky, E412x9 cukr, E412x10 draselné kationty, E412x11 skupina.

E412i	E412x1	E412x2	E412x3	E412x4	E412x5	E412x6	E412x7	E412x8	E412x9	E412x10	E412x11
1	ACCheerios	G	110.0	2.0	2.0	180.0	1.5	10.5	10.0	70.0	1.0
2	Cheerios	G	110.0	6.0	2.0	290.0	2.0	17.0	1.0	105.0	1.0
3	CocoaPuffs	G	110.0	1.0	1.0	180.0	0.0	12.0	13.0	55.0	1.0
4	CountChocula	G	110.0	1.0	1.0	180.0	0.0	12.0	13.0	65.0	1.0
5	GoldenGrahams	G	110.0	1.0	1.0	280.0	0.0	15.0	9.0	45.0	1.0
6	HoneyNutCheerios	G	110.0	3.0	1.0	250.0	1.5	11.5	10.0	90.0	1.0
7	Kix	G	110.0	2.0	1.0	260.0	0.0	21.0	3.0	40.0	1.0
8	LuckyCharms	G	110.0	2.0	1.0	180.0	0.0	12.0	12.0	55.0	1.0
9	MultiGrainCheerios	G	100.0	2.0	1.0	220.0	2.0	15.0	6.0	90.0	1.0
10	OatmealRaisinCrisp	G	130.0	3.0	2.0	170.0	1.5	13.5	10.0	120.0	1.0
11	RaisinNutBran	G	100.0	3.0	2.0	140.0	2.5	10.5	8.0	140.0	1.0
12	TotalCornFlakes	G	110.0	2.0	1.0	200.0	0.0	21.0	3.0	35.0	1.0
13	TotalRaisinBran	G	140.0	3.0	1.0	190.0	4.0	15.0	14.0	230.0	1.0
14	TotalWholeGrain	G	100.0	3.0	1.0	200.0	3.0	16.0	3.0	110.0	1.0
15	Trix	G	110.0	1.0	1.0	140.0	0.0	13.0	12.0	25.0	1.0
16	Cheaties	G	100.0	3.0	1.0	200.0	3.0	17.0	3.0	110.0	1.0
17	WheatiesHoneyGold	G	110.0	2.0	1.0	200.0	1.0	16.0	8.0	60.0	1.0
18	AllBran	K	70.0	4.0	1.0	260.0	9.0	7.0	5.0	320.0	2.0
19	AppleJacks	K	110.0	2.0	0.0	125.0	1.0	11.0	14.0	30.0	2.0
20	CornFlakes	K	100.0	2.0	0.0	290.0	1.0	21.0	2.0	35.0	2.0
21	CornPops	K	110.0	1.0	0.0	90.0	1.0	13.0	12.0	20.0	2.0
22	CracklinOatBran	K	110.0	3.0	3.0	140.0	4.0	10.0	7.0	160.0	2.0
23	Crispix	K	110.0	2.0	0.0	220.0	1.0	21.0	3.0	30.0	2.0
24	FrootLoops	K	110.0	2.0	1.0	125.0	1.0	11.0	13.0	30.0	2.0
25	FrostedFlakes	K	110.0	1.0	0.0	200.0	1.0	14.0	11.0	25.0	2.0
26	FrostedMiniWheats	K	100.0	3.0	0.0	0.0	3.0	14.0	7.0	100.0	2.0
27	FruitfulBran	K	120.0	3.0	0.0	240.0	5.0	14.0	12.0	190.0	2.0
28	JustRightCrunchyNuggets	K	110.0	2.0	1.0	170.0	1.0	17.0	6.0	60.0	2.0
29	MueslixCrispyBlend	K	160.0	3.0	2.0	150.0	3.0	17.0	13.0	160.0	2.0
30	NutNHoneyCrunch	K	120.0	2.0	1.0	190.0	0.0	15.0	9.0	40.0	2.0
31	NutriGrainAlmondRaisin	K	140.0	3.0	2.0	220.0	3.0	21.0	7.0	130.0	2.0
32	NutriGrainWheat	K	90.0	3.0	0.0	170.0	3.0	18.0	2.0	90.0	2.0
33	Product19	K	100.0	3.0	0.0	320.0	1.0	20.0	3.0	45.0	2.0
34	RaisinBran	K	120.0	3.0	1.0	210.0	5.0	14.0	12.0	240.0	2.0
35	RiceKrispies	K	110.0	2.0	0.0	290.0	0.0	22.0	3.0	35.0	2.0
36	Smacks	K	110.0	2.0	1.0	70.0	1.0	9.0	15.0	40.0	2.0
37	SpecialK	K	110.0	6.0	0.0	230.0	1.0	16.0	3.0	55.0	2.0
38	CapNCrunch	Q	120.0	1.0	2.0	220.0	0.0	12.0	12.0	35.0	3.0
39	HoneyGrahamOhs	Q	120.0	1.0	2.0	220.0	1.0	12.0	11.0	45.0	3.0
40	Life	Q	100.0	4.0	2.0	150.0	2.0	12.0	6.0	95.0	3.0
41	PuffedRice	Q	50.0	1.0	0.0	0.0	0.0	13.0	0.0	15.0	3.0
42	PuffedWheat	Q	50.0	2.0	0.0	0.0	1.0	10.0	0.0	50.0	3.0
43	QuakerOatmeal	Q	100.0	5.0	2.0	0.0	2.7	1.0	1.0	110.0	3.0

### Úloha E4.13 Posouzení struktury, kvality a ceny hovězího masa mladých býků (EDA, PCA, CLU)

Data: E413i index býka, E413x1 plemeno (1 značí Angus, 5 značí Hereford, 8 značí Simental), E413x2 prodejní cena [US \$], E413x3 výška v kohoutku u ročního býka [palce], E413x4 hmotnost těla bez tuku [libry], E413x5 procento hmoty masa bez tuku [%], E413x6 velikost ve stupnici 1 (malý) až 8 (velký), E413x7 hřbetní tuk [palce], E413x8 výška v kohoutku při prodeji býka [palce], E413x9 hmotnost býka [libry].

E413i	E413x1	E413x2	E413x3	E413x4	E413x5	E413x6	E413x7	E413x8	E413x9
1	1	2200.0	51.0	1128.0	70.9	7.0	0.3	54.8	1720.0
2	1	2250.0	51.9	1108.0	72.1	7.0	0.3	55.3	1575.0
3	1	1625.0	49.9	1011.0	71.6	6.0	0.2	53.1	1410.0
4	1	4600.0	53.1	993.0	68.9	8.0	0.4	56.4	1595.0
5	1	2150.0	51.2	996.0	68.6	7.0	0.3	55.0	1488.0
6	1	1225.0	49.2	985.0	71.4	6.0	0.2	51.4	1500.0
7	1	2250.0	51.0	959.0	72.1	7.0	0.2	54.0	1522.0
8	1	4000.0	51.5	1060.0	69.3	7.0	0.3	55.6	1765.0
9	1	1600.0	50.1	979.0	71.2	6.0	0.3	51.5	1365.0
10	1	1525.0	49.6	1083.0	75.8	6.0	0.3	54.6	1640.0
11	1	1850.0	50.6	1036.0	69.2	6.0	0.2	54.8	1570.0
12	1	2850.0	51.1	870.0	70.9	7.0	0.2	52.9	1450.0
13	1	2650.0	51.1	998.0	65.5	7.0	0.4	54.6	1505.0
14	1	1550.0	50.2	973.0	69.5	6.0	0.4	53.0	1530.0
15	1	2000.0	49.0	893.0	73.9	6.0	0.2	51.9	1470.0
16	1	2300.0	49.6	975.0	68.2	6.0	0.5	52.9	1842.0
17	1	1900.0	49.1	997.0	67.9	6.0	0.3	54.0	1500.0
18	1	1400.0	48.4	946.0	68.6	5.0	0.2	51.2	1480.0
19	1	1650.0	50.9	928.0	67.2	6.0	0.3	54.1	1480.0
20	1	1500.0	49.5	963.0	69.4	6.0	0.4	53.1	1670.0
21	1	1375.0	49.2	911.0	67.4	6.0	0.2	53.4	1490.0
22	1	1500.0	48.1	1003.0	70.5	5.0	0.3	54.7	1748.0
23	1	2400.0	51.1	915.0	64.9	7.0	0.3	54.6	1725.0
24	1	1425.0	48.9	924.0	72.7	5.0	0.2	52.1	1374.0
25	1	1525.0	49.4	959.0	68.4	6.0	0.2	52.6	1565.0
26	1	1800.0	47.7	944.0	66.5	5.0	0.4	53.3	1556.0
27	1	2500.0	50.6	897.0	67.2	6.0	0.3	54.9	1688.0
28	1	1600.0	48.9	974.0	71.0	5.0	0.3	54.2	1722.0
29	1	1300.0	49.9	872.0	70.7	6.0	0.2	53.3	1325.0
30	1	1400.0	48.4	841.0	71.3	5.0	0.2	51.5	1365.0
31	1	1300.0	48.6	920.0	71.4	5.0	0.2	52.9	1450.0
32	1	1400.0	47.6	974.0	69.7	5.0	0.2	51.9	1570.0
33	5	2000.0	50.5	1002.0	68.8	6.0	0.2	54.4	1735.0
34	5	1300.0	50.2	998.0	68.7	6.0	0.2	52.9	1540.0
35	5	1300.0	49.0	1015.0	69.8	6.0	0.3	51.9	1550.0
36	5	1300.0	48.7	1056.0	72.9	5.0	0.2	52.6	1525.0
37	5	1500.0	49.6	984.0	71.4	6.0	0.2	53.4	1650.0
38	5	1225.0	48.9	934.0	66.0	5.0	0.2	52.1	1430.0
39	5	2750.0	49.7	929.0	66.9	6.0	0.3	53.3	1688.0
40	5	1500.0	49.9	919.0	67.1	6.0	0.2	54.3	1425.0
41	5	1325.0	47.8	931.0	67.1	5.0	0.3	51.5	1520.0
42	5	1800.0	49.6	952.0	69.4	6.0	0.3	52.3	1512.0
43	5	1375.0	51.0	1002.0	72.1	7.0	0.3	51.9	1410.0
44	5	975.0	48.6	936.0	65.3	5.0	0.4	51.4	1550.0
45	5	1325.0	48.3	870.0	65.6	5.0	0.3	52.5	1588.0
46	5	1850.0	50.1	853.0	67.9	6.0	0.2	52.9	1390.0
47	5	1025.0	48.8	843.0	67.3	5.0	0.2	50.4	1390.0
48	5	1000.0	47.7	913.0	68.2	5.0	0.2	49.4	1345.0
49	5	975.0	47.2	844.0	70.6	5.0	0.2	50.1	1285.0
50	8	1750.0	54.0	1252.0	76.5	8.0	0.2	56.9	1648.0
51	8	1450.0	53.3	1383.0	81.4	8.0	0.2	59.6	1904.0
52	8	1200.0	52.8	1076.0	74.0	7.0	0.2	55.5	1615.0
53	8	2000.0	53.5	1175.0	74.5	8.0	0.1	57.4	1686.0
54	8	1450.0	53.2	1027.0	71.2	8.0	0.1	56.9	1696.0
55	8	1800.0	52.3	1116.0	71.1	7.0	0.1	57.5	1620.0
56	8	1525.0	51.8	1095.0	71.1	7.0	0.2	54.6	1712.0
57	8	1925.0	52.7	1141.0	78.5	7.0	0.2	55.6	1572.0
58	8	3450.0	54.8	1039.0	70.6	8.0	0.1	58.7	1600.0
59	8	1650.0	52.8	981.0	74.1	7.0	0.1	56.9	1750.0

60	8	1900.0	52.4	933.0	71.5	7.0	0.1	56.2	1640.0
61	8	1850.0	51.2	1083.0	74.5	7.0	0.2	55.9	1752.0
62	8	1550.0	52.3	1143.0	77.7	7.0	0.1	56.1	1785.0
63	8	1825.0	53.0	1055.0	76.8	8.0	0.1	56.7	1526.0
64	8	1475.0	52.9	1037.0	75.0	7.0	0.1	55.5	1406.0
65	8	2200.0	51.8	1076.0	74.5	7.0	0.2	55.8	1475.0
66	8	1850.0	53.1	964.0	70.8	8.0	0.1	55.5	1535.0
67	8	1550.0	51.2	1057.0	74.8	7.0	0.1	55.5	1520.0
68	8	1250.0	50.8	1040.0	74.5	6.0	0.1	55.8	1516.0
69	8	1350.0	52.7	1079.0	75.5	7.0	0.2	56.1	1595.0
70	8	1725.0	51.4	1034.0	71.2	7.0	0.1	56.0	1655.0
71	8	1750.0	50.7	1012.0	71.6	6.0	0.1	54.3	1480.0
72	8	1450.0	51.4	997.0	73.4	7.0	0.1	55.2	1454.0
73	8	1200.0	49.8	991.0	70.8	6.0	0.2	54.6	1475.0
74	8	1425.0	50.0	928.0	70.8	6.0	0.1	53.9	1375.0
75	8	1250.0	50.1	990.0	71.0	6.0	0.1	54.9	1564.0
76	8	1500.0	51.7	992.0	70.6	7.0	0.2	55.1	1458.0

#### Úloha E4.14 Struktura a vazby mezi druhy a časem odchycených ryb na 28 jezerech (EDA, PCA, CLU)

Data: Korelační matice sledovaných proměnných: E414x1 ryba Bluegill, E414x2 ryba Black crappie, E414x3 ryba Smallmouth bass, E414x4 Largemouth bass, E414x5 Walley, E414x6 Northern pike.

	E414x1	E414x2	E414x3	E414x4	E414x5	E414x6
	1	0.4919	0.2636	0.4653	-0.2277	0.0652
0.4919		1	0.3127	0.3506	-0.1917	0.2045
0.2635	0.3127		1	0.4108	0.0647	0.2493
0.4653	0.3506	0.4108		1	-0.2249	0.2293
-0.2277	-0.1917	0.0647	-0.2249		1	-0.2144
0.0652	0.2045	0.2493	0.2293	-0.2144		1

#### Úloha E4.15 Korelace mezi klimatickými a environmentálními proměnnými při vyšetřování ovzduší (EDA, CORA, PCA, FACT, CLU)

Data: E415i index, E415j název města, E415x1 koncentrace SO<sub>2</sub> [μg/m<sup>3</sup>], E415x2 roční průměrná teplota [°F], E415x3 počet podniků s více než 20 zaměstnanci, E415x4 počet obyvatelstva v tisících, E415x5 průměrná rychlost větru [mile/hod], E415x6 roční srážkový průměr [inch], E415x7 počet deštivých dní v roce [dny].

E415i	E415j	E415x1	E415x2	E415x3	E415x4	E415x5	E415x6	E415x7
1	Phoenix	10.0	70.3	213.0	582.0	6.0	7.05	36.00
2	Lrock	13.0	61.0	91.0	132.0	8.2	48.52	100.00
3	Sfran	12.0	56.7	453.0	716.0	8.7	20.66	67.00
4	Denver	17.0	51.9	454.0	515.0	9.0	12.95	86.00
5	Hartford	56.0	49.1	412.0	158.0	9.0	43.37	127.00
6	Wilming	36.0	54.0	80.0	80.0	9.0	40.25	114.00
7	Washing	29.0	57.3	434.0	757.0	9.3	38.89	111.00
8	Jackson	14.0	68.4	136.0	529.0	8.8	54.47	116.00
9	Miami	10.0	75.5	207.0	335.0	9.0	59.80	128.00
10	Atlanta	24.0	61.5	368.0	497.0	9.1	48.34	115.00
11	Chicago	110.0	50.6	3344.0	3369.0	10.4	34.44	122.00
12	Indian	28.0	52.3	361.0	746.0	9.7	38.74	121.00
13	DesM	17.0	49.0	104.0	201.0	11.2	30.85	103.00
14	Wichita	8.0	56.6	125.0	277.0	12.7	30.58	82.00
15	Louisv	30.0	55.6	291.0	593.0	8.3	43.11	123.00
16	NewO	9.0	68.3	204.0	361.0	8.4	56.77	113.00
17	Baltim	47.0	55.0	625.0	905.0	9.6	41.31	111.00
18	Detroit	35.0	49.9	1064.0	1513.0	10.1	30.96	129.00
19	Minn	29.0	43.5	699.0	744.0	10.6	25.94	137.00
20	Kansas	14.0	54.5	381.0	507.0	10.0	37.00	99.00
21	StLouis	56.0	55.9	775.0	622.0	9.5	35.89	105.00
22	Omaha	14.0	51.5	181.0	347.0	10.9	30.18	98.00
23	Alburq	11.0	56.8	46.0	244.0	8.9	7.77	58.00
24	Albany	46.0	47.6	44.0	116.0	8.8	33.36	135.00
25	Buffalo	11.0	47.1	391.0	463.0	12.4	36.11	166.00
26	Cincinnati	23.0	54.0	462.0	453.0	7.1	39.04	132.00
27	Cleve	65.0	49.7	1007.0	751.0	10.9	34.99	155.00
28	Colum	26.0	51.5	266.0	540.0	8.6	37.01	134.00
29	Philad	69.0	54.6	1692.0	1950.0	9.6	39.93	115.00

30	Pittsb	61.0	50.4	347.0	520.0	9.4	36.22	147.00
31	Provid	94.0	50.0	343.0	179.0	10.6	42.75	125.00
32	Memphis	10.0	61.6	337.0	624.0	9.2	49.10	105.00
33	Nashville	18.0	59.4	275.0	448.0	7.9	46.00	119.00
34	Dallas	9.0	66.2	641.0	844.0	10.9	35.94	78.00
35	Houston	10.0	68.9	721.0	1233.0	10.8	48.19	103.00
36	SLC	28.0	51.0	137.0	176.0	8.7	15.17	89.00
37	Norfolk	31.0	59.3	96.0	308.0	10.6	44.68	116.00
38	Richmond	26.0	57.8	197.0	299.0	7.6	42.59	115.00
39	Seattle	29.0	51.1	379.0	531.0	9.4	38.79	164.00
40	Charlest	31.0	55.2	35.0	71.0	6.5	40.75	148.00
41	Milwak	16.0	45.7	569.0	717.0	11.8	29.07	123.00

#### Úloha E4.16 Vícerozměrné škálování u analýzy podobnosti 10 výrobků Coly (MDS)

Data: prvky trojúhelníkové matice vyjadřují párové vzdálenosti (nepodobnosti, dissimilarities) dvojice výrobků Coly.

Značení: (a) Pracoviště A:  $x_l$  značí sloupec dat  $E416Ax_l, \dots$ atd.,

	$E416ax_1$	$E416ax_2$	$E416ax_3$	$E416ax_4$	$E416ax_5$	$E416ax_6$	$E416ax_7$	$E416ax_8$	$E416ax_9$	$E416ax_{10}$
$E416ax_1$	0.0									
$E416ax_2$	16.0	0.0								
$E416ax_3$	81.0	47.0	0.0							
$E416ax_4$	56.0	32.0	71.0	0.0						
$E416ax_5$	87.0	68.0	44.0	71.0	0.0					
$E416ax_6$	60.0	35.0	21.0	98.0	34.0	0.0				
$E416ax_7$	84.0	94.0	98.0	57.0	99.0	99.0	0.0			
$E416ax_8$	50.0	87.0	79.0	73.0	19.0	92.0	45.0	0.0		
$E416ax_9$	99.0	25.0	53.0	98.0	52.0	17.0	99.0	84.0	0.0	
$E416ax_{10}$	16.0	92.0	90.0	83.0	79.0	44.0	24.0	18.0	98.0	0.0

(b) Pracoviště B:  $x_l$  značí sloupec dat  $E416Bx_l, \dots$ atd.

	$E416bx_1$	$E416bx_2$	$E416bx_3$	$E416bx_4$	$E416bx_5$	$E416bx_6$	$E416bx_7$	$E416bx_8$	$E416bx_9$	$E416bx_{10}$
$E416bx_1$	0.0									
$E416bx_2$	20.0	0.0								
$E416bx_3$	75.0	35.0	0.0							
$E416bx_4$	60.0	31.0	80.0	0.0						
$E416bx_5$	80.0	70.0	37.0	70.0	0.0					
$E416bx_6$	55.0	40.0	20.0	89.0	30.0	0.0				
$E416bx_7$	80.0	90.0	90.0	55.0	87.0	88.0	0.0			
$E416bx_8$	45.0	80.0	77.0	75.0	25.0	86.0	40.0	0.0		
$E416bx_9$	87.0	35.0	50.0	88.0	60.0	10.0	98.0	83.0	0.0	
$E416bx_{10}$	12.0	90.0	96.0	89.0	75.0	40.0	27.0	14.0	90.0	0



### Úloha E4.17 Vícerozměrné škálování u podobnosti hryzců ze zemí Evropy (MDS)

Data: prvky trojúhelníkové matice vyjadřují vzdálenosti (nepodobnosti, dissimilarities) lebek hryzců z různých zemí Evropy:  $x_1$  značí E417x1 a znamená Surrey, E417x2 Shropshire, E417x3 Yorkshire, E417x4 Perthshire, E417x5 Aberdeen, E417x6 Eilean Gamhna, E417x7 Alpy, E417x8 Jugoslaviie, E417x9 Německo, E417x10 Norsko, E417x11 Pyrenele I, E417x12 Pyreneje II, E417x13 Severní Španělsko, E417x14 Jižní Španělsko.

	E417x1	E417x2	E417x3	E417x4	E417x5	E417x6	E417x7	E417x8	E417x9	E417x10	E417x11	E417x12	E417x13	E417x14
E417x1	0.000													
E417x2	0.099	0.000												
E417x3	0.033	0.022	0.000											
E417x4	0.183	0.114	0.042	0.000										
E417x5	0.148	0.224	0.059	0.068	0.000									
E417x6	0.198	0.039	0.053	0.085	0.051	0.000								
E417x7	0.462	0.266	0.322	0.435	0.268	0.025	0.000							
E417x8	0.628	0.442	0.444	0.406	0.240	0.129	0.014	0.000						
E417x9	0.113	0.070	0.046	0.047	0.034	0.002	0.106	0.129	0.000					
E417x10	0.173	0.119	0.162	0.331	0.177	0.039	0.089	0.237	0.071	0.000				
E417x11	0.434	0.419	0.339	0.505	0.469	0.390	0.315	0.349	0.151	0.430	0.000			
E417x12	0.762	0.633	0.781	0.700	0.426	0.625	0.469	0.618	0.440	0.538	0.607	0.000		
E417x13	0.530	0.389	0.482	0.579	0.597	0.498	0.374	0.562	0.247	0.383	0.378	0.084	0.000	
E417x14	0.586	0.435	0.550	0.530	0.552	0.509	0.369	0.471	0.234	0.346	0.456	0.090	0.038	0

### Úloha E4.18 Fisherova úloha rozměrů okvětních lístků u 150 kosatců (CLU)

Data: použijeme data z úlohy S2.18: rozměry pro druhy lístků v mm, a to *lsepal* (S218x1), *wsepal* (S218x2), *lpetal* (S218x3), *wpetal* (S218x4) a druh kosatce *Iris*:

E418x1	E418x2	E418x3	E418x4
5.100	3.500	1.400	0.200
4.900	3.000	1.400	0.200
4.700	3.200	1.300	0.200
4.600	3.100	1.500	0.200
5.000	3.600	1.400	0.200
5.400	3.900	1.700	0.400
4.600	3.400	1.400	0.300
5.000	3.400	1.500	0.200
4.400	2.900	1.400	0.200
4.900	3.100	1.500	0.100
5.400	3.700	1.500	0.200
4.800	3.400	1.600	0.200
4.800	3.000	1.400	0.100
4.300	3.000	1.100	0.100
5.800	4.000	1.200	0.200
5.700	4.400	1.500	0.400
5.400	3.900	1.300	0.400
5.100	3.500	1.400	0.300
5.700	3.800	1.700	0.300
5.100	3.800	1.500	0.300
5.400	3.400	1.700	0.200
5.100	3.700	1.500	0.400
4.600	3.600	1.000	0.200
5.100	3.300	1.700	0.500
4.800	3.400	1.900	0.200
5.000	3.000	1.600	0.200
5.000	3.400	1.600	0.400
5.200	3.500	1.500	0.200
5.200	3.400	1.400	0.200
4.700	3.200	1.600	0.200
4.800	3.100	1.600	0.200
5.400	3.400	1.500	0.400
5.200	4.100	1.500	0.100
5.500	4.200	1.400	0.200
4.900	3.100	1.500	0.200
5.000	3.200	1.200	0.200
5.500	3.500	1.300	0.200
4.900	3.600	1.400	0.100
4.400	3.000	1.300	0.200
5.100	3.400	1.500	0.200
5.000	3.500	1.300	0.300

4.500	2.300	1.300	0.300
4.400	3.200	1.300	0.200
5.000	3.500	1.600	0.600
5.100	3.800	1.900	0.400
4.800	3.000	1.400	0.300
5.100	3.800	1.600	0.200
4.600	3.200	1.400	0.200
5.300	3.700	1.500	0.200
5.000	3.300	1.400	0.200
7.000	3.200	4.700	1.400
6.400	3.200	4.500	1.500
6.900	3.100	4.900	1.500
5.500	2.300	4.000	1.300
6.500	2.800	4.600	1.500
5.700	2.800	4.500	1.300
6.300	3.300	4.700	1.600
4.900	2.400	3.300	1.000
6.600	2.900	4.600	1.300
5.200	2.700	3.900	1.400
5.000	2.000	3.500	1.000
5.900	3.000	4.200	1.500
6.000	2.200	4.000	1.000
6.100	2.900	4.700	1.400
5.600	2.900	3.600	1.300
6.700	3.100	4.400	1.400
5.600	3.000	4.500	1.500
5.800	2.700	4.100	1.000
6.200	2.200	4.500	1.500
5.600	2.500	3.900	1.100
5.900	3.200	4.800	1.800
6.100	2.800	4.000	1.300
6.300	2.500	4.900	1.500
6.100	2.800	4.700	1.200
6.400	2.900	4.300	1.300
6.600	3.000	4.400	1.400
6.800	2.800	4.800	1.400
6.700	3.000	5.000	1.700
6.000	2.900	4.500	1.500
5.700	2.600	3.500	1.000
5.500	2.400	3.800	1.100
5.500	2.400	3.700	1.000
5.800	2.700	3.900	1.200
6.000	2.700	5.100	1.600
5.400	3.000	4.500	1.500
6.000	3.400	4.500	1.600
6.700	3.100	4.700	1.500
6.300	2.300	4.400	1.300
5.600	3.000	4.100	1.300
5.500	2.500	4.000	1.300
5.500	2.600	4.400	1.200
6.100	3.000	4.600	1.400
5.800	2.600	4.000	1.200
5.000	2.300	3.300	1.000
5.600	2.700	4.200	1.300
5.700	3.000	4.200	1.200
5.700	2.900	4.200	1.300
6.200	2.900	4.300	1.300
5.100	2.500	3.000	1.100
5.700	2.800	4.100	1.300
6.300	3.300	6.000	2.500
5.800	2.700	5.100	1.900
7.100	3.000	5.900	2.100
6.300	2.900	5.600	1.800
6.500	3.000	5.800	2.200

7.600	3.000	6.600	2.100
4.900	2.500	4.500	1.700
7.300	2.900	6.300	1.800
6.700	2.500	5.800	1.800
7.200	3.600	6.100	2.500
6.500	3.200	5.100	2.000
6.400	2.700	5.300	1.900
6.800	3.000	5.500	2.100
5.700	2.500	5.000	2.000
5.800	2.800	5.100	2.400
6.400	3.200	5.300	2.300
6.500	3.000	5.500	1.800
7.700	3.800	6.700	2.200
7.700	2.600	6.900	2.300
6.000	2.200	5.000	1.500
6.900	3.200	5.700	2.300
5.600	2.800	4.900	2.000
7.700	2.800	6.700	2.000
6.300	2.700	4.900	1.800
6.700	3.300	5.700	2.100
7.200	3.200	6.000	1.800
6.200	2.800	4.800	1.800
6.100	3.000	4.900	1.800
6.400	2.800	5.600	2.100
7.200	3.000	5.800	1.600
7.400	2.800	6.100	1.900
7.900	3.800	6.400	2.000
6.400	2.800	5.600	2.200
6.300	2.800	5.100	1.500
6.100	2.600	5.600	1.400
7.700	3.000	6.100	2.300
6.300	3.400	5.600	2.400
6.400	3.100	5.500	1.800
6.000	3.000	4.800	1.800
6.900	3.100	5.400	2.100
6.700	3.100	5.600	2.400
6.900	3.100	5.100	2.300
5.800	2.700	5.100	1.900
6.800	3.200	5.900	2.300
6.700	3.300	5.700	2.500
6.700	3.000	5.200	2.300
6.300	2.500	5.000	1.900
6.500	3.000	5.200	2.000
6.200	3.400	5.400	2.300
5.900	3.000	5.100	1.800

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## 4.9.4 Analýza hutnických a mineralogických dat

### Úloha H4.01 Popis uranového koncentrátu metodou hlavních komponent (EDA, PCA, CLU)

Data: H401i index vzorku, H401x1 obsah kationtů a aniontů [%] v uranovém koncentrátu, tj. obsah uranu [%], H401x2 obsah uhlíčanů [%], H401x3 obsah oxidu křemičitého [%], H401x4 obsah síranů [%], H401x5 obsah železa [%], H401x6 obsah draslíku [%], H401x7 obsah sodíku [%].

H401i	H401x1	H401x2	H401x3	H401x4	H401x5	H401x6	H401x7
1	72.42	0.67	0.81	0.46	0.150	1.90	2.97
2	72.74	0.68	0.78	0.52	0.171	2.20	2.70
3	74.42	0.31	0.77	0.84	0.175	2.11	1.97
4	74.41	0.33	0.61	1.05	0.171	2.10	1.80
5	74.30	0.31	0.65	1.03	0.135	1.91	1.92
6	74.23	0.33	0.53	1.01	0.148	2.10	2.10
7	73.65	0.37	0.75	0.89	0.193	2.50	2.10
8	73.64	0.36	1.05	1.02	0.320	2.20	2.10
9	73.52	0.34	0.98	1.08	0.270	2.10	2.10
10	73.79	0.33	1.02	1.13	0.230	2.20	2.10
11	73.73	0.36	0.56	1.16	0.146	2.40	2.20
12	74.04	0.38	0.60	1.05	0.146	2.20	2.10
13	73.71	0.47	0.52	1.16	0.640	2.30	2.52
14	73.56	0.41	0.55	1.00	0.167	2.50	2.82
15	74.21	0.38	0.67	0.79	0.163	2.40	1.82
16	74.06	0.34	0.68	0.86	0.190	2.20	1.82
17	73.85	0.40	0.64	0.90	0.200	2.63	1.61
18	74.03	0.43	0.55	0.91	0.330	2.20	1.67
19	73.72	0.41	0.82	0.92	0.370	1.83	1.63
20	73.49	0.40	0.81	0.96	0.260	2.50	1.74
21	73.68	0.39	0.74	0.94	0.240	2.45	1.78
22	73.69	0.35	0.75	0.96	0.187	2.19	1.95
23	74.10	0.34	0.65	1.08	0.189	1.71	1.68
24	74.38	0.37	0.88	1.05	0.240	1.39	1.46
25	74.19	0.35	0.87	0.88	0.260	1.57	1.23
26	73.60	0.34	1.09	1.11	0.270	1.93	1.43
27	73.70	0.37	1.14	0.92	0.330	2.20	1.42
28	73.26	0.38	1.13	0.84	0.350	2.40	1.55
29	72.81	0.43	1.40	0.79	0.500	2.60	1.62
30	73.23	0.43	1.15	0.87	0.580	2.40	1.82

### Úloha H4.02 Klasifikace ropy dle podílu vanadu, železa a uhlovodíků (EDA, PCA, CLU)

Data: H402i index vzorku ropy, proměnné: H402x1 obsah vanadu a H402x2 obsah železa vyjadřují obsah v popelu [promile], H402x3 obsah nasycených uhlovodíků a H402x4 obsah aromatických uhlovodíků vyjadřují obsah v desetínách promile, H402x5 je číslo ložiska.

H402i	H402x1	H402x2	H402x3	H402x4	H402x5
1	39	51	706	1219	1
2	57	31	514	839	1
3	28	31	900	1130	1
4	21	45	720	801	1
5	25	35	781	1323	1
6	59	43	625	1342	1
7	27	35	511	900	1
8	50	47	706	610	2
9	34	32	582	469	2
10	84	17	631	455	2
11	42	35	569	222	2
12	39	41	563	294	2
13	39	36	619	227	2
14	73	32	802	1292	2
15	44	46	754	576	2
16	63	13	424	827	3
17	73	24	434	299	3
18	78	18	392	609	3
19	78	25	539	620	3
20	78	26	502	250	3

21	95	17	352	571	3
22	77	14	465	863	3
23	80	14	432	787	3
24	84	18	438	798	3
25	100	18	306	767	3
26	73	15	376	684	3
27	95	22	398	502	3
28	84	15	502	1012	3
29	84	17	442	825	3
30	95	25	444	595	3
31	72	22	470	349	3
32	90	27	369	330	3
33	78	29	672	575	3
34	62	34	756	693	3
35	56	20	507	670	3
36	90	17	439	833	3
37	84	20	374	377	3
38	95	19	372	737	3
39	90	20	597	1117	3
40	62	16	423	418	3
41	73	20	439	350	3
42	41	29	578	776	3
43	54	29	464	265	3
44	50	34	421	650	3
45	62	27	397	297	3

#### Úloha H4.03 Celkové zhodnocení mezilaboratorního porovnávacího testu (EDA, PCA, CLU)

Data: H403i index vzorku, proměnné: H403x1 obsah C, H403x2 obsah Cu, H403x3 obsah P, H403x4 obsah S, H403x5 obsah Si, H403x6 obsah Ni, H403x7 obsah Mo, H403x8 obsah Cr, H403x9 obsah Mn.

H403i	H403x1	H403x2	H403x3	H403x4	H403x5	H403x6	H403x7	H403x8	H403x9
1	0.50	0.39	1.09	0.18	0.00	0.36	0.00	0.02	0.06
2	0.13	2.38	1.63	1.35	1.45	1.19	2.03	0.79	1.32
3	0.00	1.80	1.36	1.06	1.13	0.67	0.75	1.00	1.26
4	1.00	0.00	1.20	0.12	0.19	0.63	0.49	0.15	0.60
5	2.63	0.16	0.82	1.00	1.95	4.00	1.82	1.48	2.06
6	0.88	1.13	1.30	0.47	0.06	0.07	0.47	0.28	0.68
7	0.13	0.31	0.82	0.12	0.06	1.14	0.96	0.48	1.15
8	0.88	1.72	0.49	0.53	2.64	0.67	0.84	1.26	0.03
9	0.00	0.35	1.41	0.41	0.50	0.01	0.60	1.67	0.24
10	0.50	0.47	0.92	0.65	0.63	1.30	1.16	1.30	1.31
11	0.38	0.27	0.27	0.71	1.26	1.25	0.81	0.70	1.37
12	1.50	0.90	1.09	0.18	0.94	0.71	1.13	0.48	1.15
13	1.00	1.72	1.96	0.29	0.75	1.06	2.21	1.32	0.27
14	0.38	2.42	0.33	0.88	0.88	1.15	0.75	0.53	0.45
15	2.88	0.94	0.82	0.71	0.82	4.00	2.14	0.57	0.68
16	0.88	0.66	2.28	1.24	0.69	2.06	0.64	1.25	0.23
17	0.13	0.20	0.38	1.53	0.63	1.28	0.49	0.22	0.24
18	1.00	0.16	0.38	1.53	0.94	1.21	0.45	0.86	0.48
19	2.00	1.02	0.60	2.88	4.00	0.99	1.18	3.44	1.65
20	0.25	2.19	0.54	1.00	1.07	0.99	0.11	0.79	0.45
21	1.13	0.27	1.36	0.18	0.31	0.93	0.56	0.79	0.60

#### Úloha H4.04 Posouzení chemické homogenity v kruhové tyči CrNi oceli (EDA, PCA, CLU)

Data: Matice vstupních dat: H404i je index objektu, H404x1 obsah C, H404x2 obsah Mn, H404x3 obsah Si, H404x4 obsah P, H404x5 obsah S, H404x6 obsah Cu, H404x7 obsah Cr, H404x8 obsah Ni, H404x9 obsah Al, H404x10 obsah Mo, H404x11 obsah Ti, H404x12 obsah B.

H404i	H404x1	H404x2	H404x3	H404x4	H404x5	H404x6	H404x7	H404x8	H404x9	H404x10	H404x11	H404x12
3 1	0.051	0.153	1.464	27.180	28.510	0.098	1.709	0.728	1.975	1.846	2.548	0.062
3 2	0.051	0.154	1.452	27.120	29.290	0.099	1.709	0.724	1.952	1.847	2.568	0.062
3 3	0.050	0.154	1.460	27.790	30.280	0.099	1.710	0.718	1.948	1.839	2.535	0.064
3 4	0.050	0.154	1.448	27.880	29.230	0.099	1.714	0.718	1.926	1.839	2.501	0.064
3 5	0.051	0.151	1.466	27.000	28.570	0.097	1.704	0.733	1.931	1.851	2.642	0.060
3 6	0.051	0.151	1.465	27.050	29.810	0.097	1.703	0.731	1.910	1.853	2.545	0.061
3 7	0.050	0.151	1.474	26.750	28.200	0.097	1.700	0.730	1.928	1.851	2.539	0.061
3 8	0.051	0.151	1.470	27.350	29.160	0.097	1.702	0.731	1.906	1.849	2.514	0.061
5 1	0.050	0.148	1.477	24.470	26.330	0.096	1.679	0.725	2.013	1.880	2.599	0.060
5 2	0.050	0.149	1.491	25.030	27.630	0.096	1.680	0.725	2.020	1.866	2.595	0.063
5 3	0.050	0.151	1.476	26.260	28.950	0.097	1.694	0.725	1.987	1.852	2.572	0.062
5 4	0.051	0.151	1.483	26.880	29.570	0.097	1.695	0.724	1.962	1.852	2.552	0.063
5 5	0.050	0.149	1.461	25.200	26.670	0.096	1.691	0.725	1.942	1.872	2.587	0.059
5 6	0.050	0.151	1.460	26.210	27.650	0.097	1.697	0.724	1.979	1.860	2.570	0.059
5 7	0.051	0.153	1.468	27.370	29.890	0.098	1.703	0.723	1.938	1.854	2.556	0.063
5 8	0.050	0.153	1.446	27.210	28.360	0.099	1.711	0.720	1.912	1.839	2.502	0.062
6 1	0.050	0.152	1.453	26.890	28.560	0.098	1.708	0.726	1.952	1.860	2.549	0.061
6 2	0.051	0.153	1.457	27.630	29.680	0.099	1.708	0.725	1.943	1.855	2.568	0.063
6 3	0.050	0.153	1.442	27.230	28.450	0.099	1.711	0.723	1.932	1.842	2.509	0.062
6 4	0.050	0.154	1.449	28.030	29.710	0.099	1.714	0.725	1.929	1.839	2.521	0.062
6 5	0.051	0.153	1.442	27.470	29.060	0.099	1.715	0.723	1.904	1.834	2.523	0.062
6 6	0.050	0.154	1.450	27.790	30.850	0.099	1.711	0.724	1.903	1.830	2.500	0.064
6 7	0.050	0.154	1.456	27.690	29.390	0.099	1.710	0.724	1.909	1.827	2.460	0.063
6 8	0.050	0.154	1.442	27.660	29.070	0.100	1.714	0.721	1.894	1.816	2.451	0.064
7 1	0.051	0.152	1.462	27.600	29.760	0.098	1.706	0.725	1.926	1.858	2.547	0.061
7 2	0.051	0.152	1.481	27.520	29.550	0.098	1.700	0.723	1.960	1.854	2.582	0.063
7 3	0.052	0.154	1.459	28.160	29.700	0.099	1.711	0.725	1.920	1.840	2.504	0.063
7 4	0.051	0.154	1.464	28.370	29.760	0.100	1.706	0.723	1.921	1.837	2.492	0.064
7 5	0.050	0.152	1.458	27.000	28.280	0.098	1.705	0.725	1.936	1.870	2.569	0.060
7 6	0.050	0.152	1.455	26.930	28.240	0.099	1.704	0.721	1.933	1.853	2.541	0.060
7 7	0.051	0.152	1.450	27.390	29.640	0.098	1.709	0.727	1.906	1.848	2.524	0.061
7 8	0.051	0.152	1.451	27.590	29.790	0.098	1.709	0.725	1.897	1.845	2.540	0.063
8 1	0.052	0.152	1.465	27.400	30.510	0.098	1.703	0.724	1.944	1.862	2.561	0.061
8 2	0.052	0.152	1.462	27.180	29.240	0.098	1.705	0.725	1.941	1.854	2.551	0.062
8 3	0.052	0.152	1.457	27.290	29.200	0.098	1.706	0.725	1.902	1.842	2.503	0.061
8 4	0.052	0.153	1.463	28.030	29.780	0.099	1.709	0.727	1.892	1.849	2.526	0.062
8 5	0.051	0.152	1.446	26.390	27.570	0.098	1.709	0.724	1.972	1.854	2.547	0.060
8 6	0.051	0.152	1.451	26.820	28.120	0.098	1.711	0.725	1.954	1.851	2.555	0.062
8 7	0.051	0.152	1.457	27.560	29.570	0.098	1.708	0.725	1.912	1.854	2.538	0.062
8 8	0.051	0.152	1.447	27.330	29.390	0.098	1.712	0.724	1.933	1.845	2.510	0.062
12 1	0.051	0.151	1.451	26.560	27.300	0.097	1.703	0.726	1.931	1.872	2.572	0.059
12 2	0.051	0.153	1.453	27.240	29.690	0.099	1.704	0.720	1.913	1.863	2.560	0.060
12 3	0.050	0.152	1.458	26.920	28.750	0.098	1.704	0.723	1.922	1.861	2.535	0.061
12 4	0.051	0.153	1.464	27.950	29.780	0.098	1.708	0.726	1.916	1.859	2.553	0.063
12 5	0.050	0.153	1.445	27.300	29.060	0.098	1.711	0.727	1.918	1.840	2.504	0.062
12 6	0.051	0.153	1.456	27.660	29.940	0.098	1.708	0.725	1.877	1.838	2.525	0.062
12 7	0.050	0.152	1.453	27.500	29.410	0.098	1.706	0.723	1.898	1.833	2.495	0.062
12 8	0.050	0.153	1.453	27.680	29.240	0.099	1.709	0.723	1.891	1.832	2.480	0.063
14 1	0.051	0.153	1.458	27.300	28.450	0.098	1.708	0.724	1.952	1.865	2.551	0.060
14 2	0.052	0.153	1.472	27.300	29.320	0.098	1.700	0.722	1.961	1.860	2.559	0.062
14 3	0.051	0.152	1.463	27.070	27.720	0.098	1.703	0.721	1.966	1.844	2.507	0.062
14 4	0.051	0.153	1.468	27.850	30.880	0.098	1.704	0.722	1.939	1.852	2.537	0.063
14 5	0.050	0.151	1.456	26.570	28.540	0.097	1.702	0.724	1.912	1.868	2.556	0.061
14 6	0.050	0.152	1.455	26.640	28.780	0.098	1.706	0.723	1.936	1.850	2.535	0.061
14 7	0.051	0.152	1.465	27.500	29.620	0.098	1.704	0.724	1.934	1.855	2.552	0.063
14 8	0.050	0.153	1.444	27.370	30.040	0.098	1.710	0.723	1.899	1.838	2.521	0.063
15 1	0.050	0.152	1.453	26.810	28.680	0.098	1.705	0.726	1.945	1.868	2.563	0.061
15 2	0.051	0.152	1.455	26.810	27.790	0.098	1.705	0.726	1.973	1.860	2.576	0.061
15 3	0.051	0.152	1.453	26.960	28.110	0.098	1.705	0.727	1.935	1.871	2.559	0.060
15 4	0.051	0.152	1.466	26.750	29.900	0.098	1.704	0.728	1.927	1.871	2.560	0.062

15 5	0.050	0.151	1.441	27.070	27.140	0.098	1.709	0.724	1.916	1.854	2.503	0.060
15 6	0.050	0.153	1.446	27.330	29.280	0.098	1.710	0.726	1.913	1.849	2.535	0.061
15 7	0.050	0.152	1.452	27.270	28.680	0.098	1.707	0.723	1.895	1.842	2.499	0.062
15 8	0.051	0.153	1.461	27.580	30.700	0.098	1.707	0.725	1.891	1.844	2.511	0.063
16 1	0.051	0.152	1.461	27.250	29.350	0.098	1.701	0.726	1.920	1.872	2.578	0.061
16 2	0.051	0.153	1.449	27.560	28.290	0.098	1.710	0.725	1.962	1.859	2.534	0.060
16 3	0.051	0.152	1.455	26.850	28.870	0.098	1.704	0.722	1.917	1.856	2.529	0.061
16 4	0.051	0.152	1.466	27.100	28.340	0.098	1.702	0.724	1.927	1.854	2.530	0.063
16 5	0.051	0.152	1.441	27.190	29.120	0.098	1.708	0.722	1.908	1.835	2.480	0.062
16 6	0.051	0.153	1.449	27.340	30.100	0.098	1.707	0.724	1.910	1.836	2.505	0.062
16 7	0.050	0.153	1.441	27.240	29.550	0.099	1.709	0.723	1.887	1.823	2.440	0.061
16 8	0.051	0.153	1.455	27.790	29.590	0.098	1.706	0.725	1.887	1.826	2.481	0.062
17 1	0.051	0.150	1.464	26.290	27.340	0.097	1.701	0.728	1.930	1.875	2.557	0.060
17 2	0.050	0.152	1.447	26.970	28.860	0.098	1.712	0.729	1.919	1.857	2.526	0.061
17 3	0.051	0.151	1.463	26.590	27.600	0.098	1.703	0.725	1.950	1.857	2.544	0.063
17 4	0.051	0.153	1.455	27.580	30.700	0.099	1.714	0.726	1.896	1.852	2.524	0.062
17 5	0.050	0.151	1.455	26.850	28.120	0.098	1.706	0.723	1.971	1.868	2.572	0.060
17 6	0.049	0.152	1.439	26.710	28.840	0.098	1.709	0.716	1.933	1.846	2.548	0.060
17 7	0.050	0.151	1.444	27.200	29.140	0.097	1.706	0.718	1.927	1.845	2.537	0.061
17 8	0.050	0.152	1.449	27.230	28.540	0.098	1.710	0.724	1.900	1.849	2.511	0.062
19 1	0.052	0.155	1.466	28.150	29.690	0.099	1.709	0.726	1.938	1.829	2.484	0.064
19 2	0.051	0.157	1.455	28.560	31.260	0.100	1.713	0.726	1.881	1.825	2.503	0.064
19 3	0.051	0.156	1.432	28.360	30.420	0.100	1.716	0.714	1.873	1.819	2.453	0.064
19 4	0.052	0.154	1.446	28.440	30.360	0.103	1.721	0.708	1.836	1.833	2.493	0.064
19 5	0.050	0.152	1.458	26.770	28.440	0.098	1.705	0.724	1.967	1.872	2.574	0.060
19 6	0.050	0.153	1.455	26.570	28.170	0.098	1.708	0.718	1.977	1.850	2.582	0.061
19 7	0.050	0.154	1.449	27.650	29.730	0.099	1.710	0.714	1.957	1.849	2.530	0.062
19 8	0.050	0.153	1.450	27.730	29.000	0.099	1.711	0.716	1.905	1.848	2.537	0.062
22 1	0.050	0.152	1.453	26.420	28.680	0.097	1.705	0.725	1.939	1.870	2.564	0.060
22 2	0.050	0.152	1.452	26.510	27.200	0.098	1.705	0.723	1.927	1.859	2.534	0.061
22 3	0.051	0.153	1.457	27.090	28.680	0.098	1.707	0.725	1.934	1.856	2.557	0.062
22 4	0.051	0.153	1.463	28.000	30.180	0.098	1.706	0.725	1.944	1.852	2.538	0.064
22 5	0.050	0.151	1.456	26.690	29.040	0.098	1.701	0.722	1.910	1.869	2.556	0.060
22 6	0.050	0.152	1.449	27.030	29.050	0.098	1.707	0.725	1.918	1.858	2.534	0.061
22 7	0.050	0.152	1.449	27.280	29.190	0.098	1.708	0.726	1.914	1.853	2.570	0.061
22 8	0.050	0.152	1.459	27.410	29.510	0.098	1.706	0.724	1.924	1.852	2.513	0.063
23 1	0.051	0.153	1.451	27.130	29.430	0.099	1.709	0.729	1.920	1.840	2.525	0.061
23 2	0.050	0.152	1.457	27.670	29.390	0.098	1.710	0.727	1.909	1.837	2.524	0.063
23 3	0.050	0.153	1.459	27.630	28.860	0.099	1.711	0.727	1.894	1.831	2.468	0.062
23 4	0.051	0.153	1.461	27.210	30.870	0.099	1.708	0.727	1.940	1.831	2.536	0.062
23 5	0.050	0.151	1.443	25.550	27.550	0.097	1.703	0.722	1.958	1.861	2.578	0.059
23 6	0.050	0.151	1.456	26.300	28.010	0.097	1.703	0.719	1.977	1.858	2.540	0.061
23 7	0.049	0.152	1.448	26.880	28.920	0.098	1.710	0.718	1.916	1.846	2.533	0.062
23 8	0.050	0.152	1.455	27.700	29.910	0.098	1.710	0.720	1.959	1.850	2.571	0.062
24 1	0.051	0.152	1.458	27.390	29.610	0.099	1.705	0.719	1.927	1.841	2.543	0.063
24 2	0.050	0.152	1.461	27.470	29.710	0.099	1.707	0.722	1.947	1.840	2.500	0.064
24 3	0.050	0.153	1.452	28.140	29.610	0.099	1.714	0.723	1.919	1.833	2.463	0.064
24 4	0.051	0.154	1.461	27.800	30.600	0.100	1.712	0.724	1.924	1.824	2.509	0.064
24 5	0.049	0.151	1.466	25.980	26.680	0.097	1.701	0.720	1.979	1.865	2.580	0.061
24 6	0.051	0.152	1.456	26.720	28.320	0.098	1.705	0.720	1.963	1.856	2.562	0.061
24 7	0.050	0.152	1.451	26.800	28.520	0.098	1.709	0.721	1.931	1.847	2.535	0.061
24 8	0.050	0.152	1.449	27.080	28.460	0.098	1.709	0.721	1.921	1.846	2.522	0.062
25 1	0.050	0.152	1.450	26.410	28.330	0.098	1.704	0.727	2.037	1.871	2.561	0.059
25 2	0.050	0.153	1.453	26.880	28.240	0.098	1.709	0.722	1.940	1.858	2.561	0.062
25 3	0.050	0.153	1.447	27.220	28.590	0.099	1.712	0.722	1.934	1.848	2.526	0.062
25 4	0.051	0.153	1.441	26.930	29.830	0.099	1.709	0.722	1.935	1.842	2.588	0.061
25 5	0.050	0.153	1.455	27.470	28.280	0.098	1.707	0.717	1.929	1.835	2.498	0.063
25 6	0.050	0.153	1.448	27.580	28.280	0.098	1.708	0.719	1.895	1.828	2.480	0.063
25 7	0.050	0.154	1.457	28.180	29.270	0.099	1.710	0.724	1.899	1.830	2.496	0.064
25 8	0.050	0.153	1.444	28.180	30.240	0.099	1.712	0.725	1.881	1.823	2.494	0.063
28 1	0.050	0.152	1.455	26.390	28.690	0.098	1.707	0.726	1.972	1.870	2.577	0.060
28 2	0.050	0.152	1.453	26.590	27.490	0.098	1.710	0.723	1.967	1.858	2.537	0.060
28 3	0.051	0.152	1.452	27.060	28.430	0.098	1.709	0.724	1.939	1.854	2.579	0.061
28 4	0.050	0.153	1.452	27.470	29.200	0.098	1.709	0.722	1.921	1.848	2.524	0.062

28 5	0.050	0.152	1.452	27.420	28.580	0.098	1.709	0.718	1.921	1.850	2.515	0.062
28 6	0.050	0.153	1.443	27.310	28.570	0.099	1.712	0.718	1.914	1.843	2.505	0.061
28 7	0.050	0.152	1.464	27.420	28.270	0.098	1.706	0.724	1.952	1.839	2.497	0.062
28 8	0.050	0.153	1.455	27.750	29.470	0.098	1.713	0.728	1.935	1.835	2.494	0.062

#### Úloha H4.05 Dispergace mletého kalcinátu titanové běloby rutilového typu (EDA, PCA, CLU)

Data:  $H405i$  index objektu,  $H405x_1$  značí Ford [s],  $H405x_2$  značí viskozita [mPas],  $H405x_3$  značí pH,  $H405x_4$  značí vodivost [m S cm],  $H405x_5$  značí rutil [%],  $H405x_6$  značí Fe [%],  $H405x_7$  značí  $Sb_2O_3$  [%],  $H405x_8$  značí  $K_2O$  [%],  $H405x_9$  značí obsah síry [%],  $H405x_{10}$  značí  $P_2O_5$  [%],  $H405x_{11}$  značí  $SiO_2$  [%],  $H405x_{12}$  značí  $Nb_2O_5$  [%],  $H405x_{13}$  značí  $ZrO_2$  [%],  $H405x_{14}$  značí  $TiO_2$  [%],  $H405x_{15}$  značí  $Na_2O$  [%],  $H405x_{16}$  značí specifická hmotnost vody [g/100 g],  $H405x_{17}$  značí bod smočení [g/100 g],  $H405x_{18}$  značí  $Sb_2O_3$  [g/100 g].

$i$	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$	$x_{10}$	$x_{11}$	$x_{12}$	$x_{13}$	$x_{14}$	$x_{15}$	$x_{16}$	$x_{17}$	$x_{18}$
1	13.1	573.0	8.1	526.0	99.7	0	0.004	0.206	0.049	0.172	0.000	0.056	0.035	98.740	0.021	21.540	20.530	88.170
2	13.6	837.0	6.8	643.0	99.4	3E-04	0.003	0.201	0.064	0.156	0.001	0.053	0.033	98.300	0.037	22.950	22.310	88.820
3	13.4	763.0	6.9	647.0	99.6	6E-04	0.003	0.199	0.062	0.154	0.003	0.052	0.033	98.380	0.035	23.520	22.300	86.480
4	13.8	852.0	6.9	639.0	97.9	4E-04	0.005	0.204	0.063	0.166	0.000	0.054	0.034	98.420	0.030	22.840	22.970	89.010
5	14.3	890.0	6.9	663.0	99.3	3E-04	0.004	0.205	0.068	0.165	0.002	0.055	0.034	98.660	0.039	23.890	23.800	89.430
6	14.0	890.0	6.8	655.0	98.8	3E-04	0.004	0.199	0.063	0.160	0.002	0.054	0.034	98.130	0.038	23.780	23.410	86.210
7	21.5	1540.0	6.4	728.0	97.3	4E-04	0.004	0.210	0.096	0.165	0.003	0.055	0.034	98.600	0.030	24.670	24.590	95.540
8	14.3	984.0	6.6	659.0	98.6	4E-04	0.003	0.207	0.076	0.161	0.001	0.054	0.033	98.660	0.030	23.820	24.510	87.370
9	14.2	955.0	6.6	693.0	99.0	6E-04	0.004	0.209	0.077	0.162	0.002	0.054	0.033	98.710	0.032	24.690	24.590	91.420
10	13.9	811.0	7.5	650.0	99.5	2E-04	0.004	0.207	0.064	0.155	0.000	0.052	0.031	98.810	0.037	22.960	22.440	85.530
11	13.6	717.0	7.4	630.0	99.6	3E-04	0.003	0.204	0.064	0.152	0.001	0.053	0.032	98.720	0.024	22.970	22.920	85.010
12	13.6	703.0	6.9	664.0	99.4	4E-04	0.003	0.207	0.069	0.158	0.003	0.053	0.032	98.590	0.036	22.690	22.430	85.110
13	13.7	828.0	6.9	655.0	99.4	1E-04	0.003	0.203	0.066	0.155	0.000	0.052	0.033	98.650	0.020	22.880	23.190	85.770
14	13.0	665.0	7.8	636.0	99.6	1E-04	0.003	0.206	0.062	0.151	0.003	0.052	0.032	97.870	0.030	22.620	22.470	85.120
15	13.5	854.0	7.7	662.0	99.1	1E-04	0.003	0.209	0.064	0.162	0.000	0.052	0.032	98.320	0.035	23.530	24.050	90.870
16	13.3	715.0	7.5	666.0	98.9	0	0.003	0.208	0.059	0.168	0.000	0.052	0.033	98.770	0.026	22.730	22.660	90.660
17	13.0	717.0	7.6	643.0	98.9	1E-04	0.003	0.207	0.058	0.176	0.002	0.053	0.033	98.360	0.032	22.630	22.890	90.110
18	13.1	725.0	7.6	657.0	98.8	5E-04	0.002	0.206	0.057	0.176	0.000	0.053	0.033	98.270	0.027	21.880	22.290	87.320
19	13.2	655.0	7.8	652.0	98.6	7E-04	0.003	0.209	0.059	0.176	0.002	0.053	0.033	98.380	0.050	22.300	22.080	88.740
20	12.4	554.0	8.2	544.0	99.8	0	0.003	0.198	0.050	0.178	0.000	0.052	0.032	98.760	0.037	21.390	21.850	84.540
21	13.0	720.0	7.9	523.0	99.7	1E-04	0.003	0.193	0.053	0.175	0.001	0.053	0.032	98.840	0.025	22.790	22.570	86.750
22	13.3	741.0	7.7	599.0	99.7	7E-04	0.003	0.202	0.059	0.161	0.002	0.051	0.031	98.440	0.019	24.520	24.770	86.900
23	12.8	669.0	8.6	580.0	99.6	2E-04	0.003	0.202	0.059	0.158	0.001	0.052	0.031	98.620	0.030	22.540	23.250	85.050
24	13.8	792.0	8.3	612.0	99.4	2E-04	0.003	0.199	0.062	0.154	0.001	0.051	0.032	98.670	0.024	25.300	25.200	90.560
25	13.5	869.0	7.9	601.0	99.3	7E-04	0.003	0.188	0.060	0.151	0.000	0.052	0.032	98.970	0.039	25.610	25.590	86.930
26	13.2	900.0	7.9	593.0	99.2	1E-04	0.003	0.193	0.065	0.153	0.002	0.052	0.033	98.430	0.030	22.910	22.880	81.390
27	13.0	773.0	7.7	575.0	94.2	0.002	0.004	0.199	0.058	0.172	0.002	0.052	0.032	98.480	0.035	23.780	24.110	80.960
28	13.3	883.0	7.9	585.0	99.3	0.002	0.002	0.194	0.059	0.166	0.007	0.052	0.031	98.830	0.021	23.860	23.740	81.640



## 4.9.5 Analýza ekonomických a sociologických dat

### Úloha S4.01 Pevnost stavebního řeziva - dřevěných prken (EDA, CORA, PCA)

Data: S401i index vzorku řeziva, pevnost dřevěných desek (řádky) stanovená různými metodami (sloupce): S401x1 pevnost v průhybu po rázové vlně, S401x2 pevnost při vibračním namáhání, S401x3 pevnost 1. statickou metodou, S401x4 pevnost 2. statickou metodou.

$i$	$x_1$	$x_2$	$x_3$	$x_4$
1	1889	1651	1561	1778
2	2403	2048	2087	2197
3	2119	1700	1815	2222
4	1645	1627	1110	1533
5	1976	1916	1614	1883
6	1712	1712	1439	1546
7	1943	1685	1271	1671
8	2104	1820	1717	1874
9	2983	2794	2412	2581
10	1745	1600	1384	1508
11	1710	1591	1518	1667
12	2046	1907	1627	1898
13	1840	1841	1595	1741
14	1867	1685	1493	1678
15	1859	1649	1889	1714
16	1954	2149	1180	1281
17	1325	1170	1382	1176
18	1419	1371	1252	1308
19	1828	1634	1602	1755
20	1725	1594	1313	1646
21	2276	2189	1547	2111
22	1899	1614	1422	1477
23	1633	1513	1290	1516
24	2061	1867	1646	2037
25	1856	1493	1356	1533
26	1727	1412	1238	1469
27	2168	1896	1701	1834
28	1655	1675	1464	1597
29	2326	2301	2065	2234
30	1490	1187	1714	1284

### Úloha S4.02 Odolnost skel (EDA, CORA, PCA, CLU)

Data: S402x1 značí tvrdost skla podle Brinella a S402x2 značí mez odporu proti lomu, cit.<sup>21</sup>.

$x_1$	331	335	331	331	341	331	331	339	333	331	331	331	337	341	327
$x_2$	109	111.5	109.5	109.5	114	113	110.5	107.5	114.5	112	110	115	110	110.5	109.5

### Úloha S4.03 Pracnost žehlení obleků

Data: Korelační matice  $\mathbf{R}$

$$\mathbf{R} = \begin{bmatrix} 1.000 & 0.088 & 0.334 & 0.191 & 0.173 & 0.123 \\ 0.088 & 1.000 & 0.186 & 0.384 & 0.262 & 0.040 \\ 0.334 & 0.186 & 1.000 & 0.343 & 0.144 & 0.080 \\ 0.191 & 0.384 & 0.343 & 1.000 & 0.375 & 0.142 \\ 0.173 & 0.262 & 0.144 & 0.375 & 1.000 & 0.334 \\ 0.123 & 0.040 & 0.80 & 0.142 & 0.334 & 1.000 \end{bmatrix}$$

#### Úloha S4.04 Shluková analýza původu ropy (DA, CLU)

Data: Obsahy různých látek v ropě získané ze dvou ložisek:  $S404i$  index ložiska,  $S404u$  druh ložiska,  $S404x1$  obsah vanadu,  $S404x2$  obsah železa,  $S404x3$  obsah nasycených uhlovodíků,  $S404x4$  obsah aromatických uhlovodíků.

$S404i$	$S404u$	$S404x1$	$S404x2$	$S404x3$	$S404x4$
1	1	39	51	706	1219
2	1	57	31	514	863
3	1	28	31	900	1130
4	1	21	45	720	801
5	1	25	35	781	1323
6	1	59	43	625	1342
7	1	27	35	511	900
8	2	50	47	706	610
9	2	34	32	582	469
10	2	84	17	631	455
11	2	42	35	569	222
12	2	39	41	563	294
13	2	39	36	619	227
14	2	73	32	802	1292
15	2	44	46	754	576

#### Úloha S4.05 Sociologický průzkum názorů sedmi etnik (EDA, PCA, CLU)

Data:  $S405i$  index zástupce etnika,  $S405x1$ ,  $S405x2$ ,  $S405x3$ ,  $S405x4$ ,  $S405x5$ ,  $S405x6$ ,  $S405x7$  souhlasné reakce na 10 otázek (řádky) zástupcům 7 etnik (sloupce).

$S405i$	$S405x1$	$S405x2$	$S405x3$	$S405x4$	$S405x5$	$S405x6$	$S405x7$
Otázka							
1	53	26	25	39	53	22	9
2	57	42	53	38	20	10	3
3	53	24	27	42	48	45	8
4	60	21	32	33	56	32	21
5	54	51	51	43	30	28	15
6	55	70	73	43	57	34	12
7	62	70	83	67	57	40	33
8	79	87	87	80	65	51	27
9	60	53	57	48	46	37	16
10	86	87	85	80	81	67	44

#### Úloha S4.06 Rozbor klasifikace žáků osmých tříd (EDA, PCA, CLU)

Data:  $S406i$  index žáka,  $S406x1$  český jazyk,  $S406x2$  anglický nebo německý jazyk,  $S406x3$  dějepis,  $S406x4$  občanská výchova,  $S406x5$  zeměpis,  $S406x6$  matematika,  $S406x7$  přírodopis,  $S406x8$  fyzika,  $S406x9$  chemie,  $S406x10$  hudební výchova a zpěv,  $S406x11$  výtvarná výchova,  $S406x12$  tělesná výchova,  $S406x13$  rodinná výchova,  $S406x14$  volitelný předmět.

$i$	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$	$x_{10}$	$x_{11}$	$x_{12}$	$x_{13}$	$x_{14}$
1	3	3	3	1	3	3	3	3	3	1	1	1	1	1
2	2	2	2	1	2	2	2	1	2	1	1	1	1	1
3	2	2	2	1	2	2	3	1	3	1	1	1	1	1
4	2	3	3	2	3	2	1	1	2	1	1	1	1	1
5	2	2	1	1	2	1	1	1	2	1	1	1	1	1
6	3	3	2	2	1	3	2	2	3	1	2	1	2	1
7	2	1	2	1	2	2	2	2	3	1	1	1	1	1
8	2	3	3	2	2	3	3	2	3	1	1	1	1	1
9	2	3	3	1	3	4	2	2	3	1	1	1	1	1
10	2	2	1	1	1	2	2	1	1	1	1	1	1	1
11	4	4	3	3	3	3	4	2	3	1	1	1	1	1
12	3	3	2	1	2	3	3	2	3	1	1	1	1	1
13	2	2	2	1	1	2	2	1	2	1	1	1	1	1
14	2	2	2	1	2	2	2	2	3	1	1	1	1	1
15	3	3	2	2	2	2	2	2	3	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17	4	4	4	2	2	4	4	3	4	1	1	2	2	3
18	2	2	2	1	2	2	2	1	2	1	1	2	2	1
19	2	1	2	1	1	1	1	1	2	1	1	1	1	1

20	2	3	3	1	2	2	3	2	3	1	1	1	1	1
21	2	3	3	2	3	1	2	2	3	1	1	1	1	1
22	2	3	3	2	2	2	2	2	3	1	1	1	1	1
23	4	4	4	2	3	4	4	3	4	1	1	2	1	1
24	3	3	3	3	3	3	4	3	3	1	2	1	1	2
25	3	3	3	2	3	3	3	3	3	1	1	1	2	2
26	2	2	1	1	1	2	1	1	2	1	1	1	1	1
27	1	1	1	1	1	1	1	1	2	1	1	1	1	1
28	2	3	2	1	2	2	1	2	3	1	1	1	1	1
29	3	3	3	1	1	2	1	2	3	1	1	1	1	1
30	4	4	3	2	3	4	4	3	4	1	1	1	1	1
31	2	2	2	2	2	2	1	2	3	1	1	1	1	1
32	2	3	2	1	1	2	1	1	2	1	1	1	1	1
33	4	4	4	2	3	4	4	3	4	1	2	1	2	2
34	3	3	4	2	3	3	3	3	4	1	1	1	1	1
35	1	1	2	1	1	1	1	1	2	1	1	1	1	1
36	2	2	2	1	2	3	2	1	3	1	1	1	1	1
37	3	4	4	1	3	4	3	3	4	1	1	2	2	1
38	3	4	4	2	2	4	2	2	3	1	1	1	1	2
39	4	4	4	3	3	4	4	3	4	1	1	1	2	1
40	1	2	1	1	2	1	1	1	1	1	1	1	1	1
41	2	2	3	1	2	2	3	2	3	1	1	1	1	1
42	3	4	3	2	3	3	3	2	4	1	2	1	2	2
43	4	4	4	3	3	4	4	4	4	1	1	1	3	3
44	2	2	3	2	2	2	3	2	3	1	1	1	1	1

#### Úloha S4.07 Klasifikace aut (EDA, PCA, FACT, CLU)

Data:  $S407i$  index auta,  $S407x1$  spotřeba benzínu v mílich na 1 gallon (mpg),  $S407x2$  počet válců (cyl),  $S407x3$  vrtání (displ),  $S407x4$  výkon v koňských silách (horse),  $S407x5$  zrychlení (accel),  $S407x6$  poslední dvojčíslí roku výroby (year),  $S407x7$  hmotnost vozu (weight),  $S407x8$  země původu (origin: 1 USA, 2 Evropa, 3 Japonsko),  $S407x9$  výrobce (make),  $S407x10$  model,  $S407x11$  cena vozu v USS v roce 1978 (price).

$i$	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$	$x_{10}$	$x_{11}$
1	43.1	4	90	48	21.5	78	1985	2	Volkswagen	Rabbit DI	2400
2	36.1	4	98	66	14.4	78	1800	1	Ford	Fiesta	1900
3	32.8	4	78	52	19.4	78	1985	3	Mazda	GLC Deluxe	2200
4	39.4	4	85	70	18.6	78	2070	3	Datsun	B210 GX	2725
5	36.1	4	91	60	16.4	78	1800	3	Honda	Civic CVCC	2250
6	19.9	8	260	110	15.5	78	3365	1	Oldsmobile	Cutlass	3300
7	19.4	8	318	140	13.2	78	3735	1	Dodge	Diplomat	3125
8	20.2	8	302	139	12.8	78	3570	1	Mercury	Monarch	2850
9	19.2	6	231	105	19.2	78	3535	1	Pontiac	Phoenix	2800
10	20.5	6	200	95	18.2	78	3155	1	Chevrolet	Malibu	3275
11	20.2	6	200	85	15.8	78	2965	1	Ford	Fairmont A	2375
12	25.1	4	140	88	15.4	78	2720	1	Ford	Fairmont M	2275
13	20.5	6	225	100	17.2	78	3430	1	Plymouth	Volare	2700
14	19.4	6	232	90	17.2	78	3210	1	AMC	Concord	2300
15	20.6	6	231	105	15.8	78	3380	1	Buick	Century	3300
16	20.8	6	200	85	16.7	78	3070	1	Mercury	Zephyr	2425
17	18.6	6	225	110	18.7	78	3620	1	Dodge	Aspen	2700
18	18.1	6	258	120	15.1	78	3410	1	AMC	Concord DI	2425
19	19.2	8	305	145	13.2	78	3425	1	Chevrolet	MonteCarlo	3900
20	17.7	6	231	165	13.4	78	3445	1	Buick	RegalTurbo	4400
21	18.1	8	302	139	11.2	78	3205	1	Ford	Futura	2525
22	17.5	8	318	140	13.7	78	4080	1	Dodge	Magnum X	3000
23	30.0	4	98	68	16.5	78	2155	1	Chevrolet	Chevette	2100
24	27.5	4	134	95	14.2	78	2560	3	Toyota	Corona	2975
25	27.2	4	119	97	14.7	78	2300	3	Datsun	510	2775
26	30.9	4	105	75	14.5	78	2230	1	Dodge	Omni	2250
27	21.1	4	134	95	14.8	78	2515	3	Toyota	Celica GT	3700
28	23.2	4	156	105	16.7	78	2745	1	Plymouth	Sapporo	3200
29	23.8	4	151	85	17.6	78	2855	1	Oldsmobile	Starfire	2400
30	23.9	4	119	97	14.9	78	2405	3	Datsun	200-SX	2975

31	20.3	5	131	103	15.9	78	2830	2	Audi	5000	4475
32	17.0	6	163	125	13.6	78	3140	2	Volvo	264GL	5875
33	21.6	4	121	115	15.7	78	2795	2	Saab	99GLE	4200
34	16.2	6	163	133	15.8	78	3410	2	Peugeot	604SL	5450
35	31.5	4	89	71	14.9	78	1990	2	Volkswagen	Scirocco	3675
36	29.5	4	98	68	16.6	78	2135	3	Honda	Accord LX	3425
37	21.5	6	231	115	15.4	79	3245	1	Pontiac	Lemans V6	3925
38	19.8	6	200	85	18.2	79	2990	1	Mercury	Zephyr 6	3200
39	22.3	4	140	88	17.3	79	2890	1	Ford	Fairmont 4	2975
40	20.2	6	232	90	18.2	79	3265	1	AMC	Concord DL6	3150
41	20.6	6	225	110	16.6	79	3360	1	Dodge	Aspen 6	3325
42	17.0	8	305	130	15.4	79	3840	1	Chevrolet	Caprice	4650
43	17.6	8	302	129	13.4	79	3725	1	Ford	LTD Landau	4850
44	16.5	8	351	138	13.2	79	3955	1	Mercury	Grand Marqs	5725
45	18.2	8	318	135	15.2	79	3830	1	Dodge	St. Regis	4025
46	16.9	8	350	155	14.9	79	4360	1	Buick	Estate SW	5225
47	15.5	8	351	142	14.3	79	4054	1	Ford	Country SW	4825
48	19.2	8	267	125	15.0	79	3605	1	Chevrolet	Malibu SW	4100
49	18.5	8	360	150	13.0	79	3940	1	Chrysler	Lebaron SW	4725
50	31.9	4	89	71	14.0	79	1925	2	Volkswagen	Rabbit Cus	3100
51	34.1	4	86	65	15.2	79	1975	3	Mazda	GLC Deluxe	2750
52	35.7	4	98	80	14.4	79	1915	1	Dodge	Colt Hatch	2700
53	27.4	4	121	80	15.0	79	2670	1	AMC	Spirit DL	2725
54	25.4	5	183	77	20.1	79	3530	2	Mercedes	300D	15475
55	23.0	8	350	125	17.4	79	3900	1	Cadillac	Eldorado	9900
56	27.2	4	141	71	24.8	79	3190	2	Peugeot	504	4675
57	23.9	8	260	90	22.2	79	3420	1	Oldsmobile	Cutlass	4050
58	34.2	4	105	70	13.2	79	2200	1	Plymouth	Horizon	2625
59	34.5	4	105	70	14.9	79	2150	1	Plymouth	Horizon TC3	2775
60	31.8	4	85	65	19.2	79	2020	3	Datsun	210	2750
61	37.3	4	91	69	14.7	79	2130	2	Fiat	Strada Cus	2275
62	28.4	4	151	90	16.0	79	2670	1	Buick	Skylark Lim	3525
63	28.8	6	173	115	11.3	79	2595	1	Chevrolet	Citation	3625
64	26.8	6	173	115	12.9	79	2700	1	Oldsmobile	Omega	3525
65	33.5	4	151	90	13.2	79	2556	1	Pontiac	Phoenix	3325
66	41.5	4	98	76	14.7	80	2144	2	Volkswagen	Rabbit	7000
67	38.1	4	89	60	18.8	80	1968	3	Toyota	Corolla Ter	3850
68	32.1	4	98	70	15.5	80	2120	1	Chevrolet	Chevette	2900
69	37.2	4	86	65	16.4	80	2019	3	Datsun	310	3525
70	28.0	4	151	90	16.5	80	2678	1	Chevrolet	Citation	3625
71	26.4	4	140	88	18.1	80	2870	1	Ford	Fairmont	3525
72	24.3	4	151	90	20.1	80	3003	1	AMC	Concord	3625
73	19.1	6	225	90	18.7	80	3381	1	Dodge	Aspen	3700
74	34.3	4	97	78	15.8	80	2188	2	Audi	4000	5900
75	29.8	4	134	90	15.5	80	2711	3	Toyota	Corona LB	5500
76	31.3	4	120	75	17.5	80	2542	3	Mazda	626	4675
77	37.0	4	119	92	15.0	80	2434	3	Datsun	510 Hatch	4050
78	32.2	4	108	75	15.2	80	2265	3	Toyota	Corolla	3975
79	46.6	4	86	65	17.9	80	2110	3	Mazda	GLC	3350
80	27.9	4	156	105	14.4	80	2800	1	Dodge	Colt	3200
81	40.8	4	85	65	19.2	80	2110	3	Datsun	210	3300
82	44.3	4	90	48	21.7	80	2085	2	Volkswagen	RabbitD	13900
83	43.4	4	90	48	23.7	80	2335	2	Volkswagen	DasherD	13825
84	36.4	5	121	67	19.9	80	2950	2	Audi	5000SD	17975
85	30.4	4	146	67	21.8	80	3250	2	Mercedes	240D	14275
86	44.6	4	91	67	13.8	80	1850	3	Honda	Civic1500G	3925
87	40.9	4	85	67	17.3	80	1835	2	Renault	LeCar Delx	2575
88	33.8	4	97	67	18.0	80	2145	3	Subaru	DL	3625
89	29.8	4	89	62	15.3	80	1845	2	Volkswagen	Rabbit	7000
90	32.7	6	168	132	11.4	80	2910	3	Datsun	280-ZX	8150
91	23.7	3	70	100	12.5	80	2420	3	Mazda	RX-7GS	7250

92	35.0	4	122	88	15.1	80	2500	2	Triumph	TR7 Coupe	5000
93	23.6	4	100	140	14.3	80	2905	1	Ford	Must Cobra	4250
94	32.4	4	107	72	17.0	80	2290	3	Honda	Accord	4700
95	27.2	4	135	84	15.7	81	2490	1	Plymouth	Reliant	5100
96	26.6	4	151	84	16.4	81	2635	1	Buick	Skylark	5175
97	25.8	4	156	92	14.4	81	2620	1	Dodge	Aries SW	4950
98	23.5	6	173	110	12.6	81	2725	1	Chevrolet	Citation	4550
99	30.0	4	135	84	12.9	81	2385	1	Plymouth	Reliant	4900
100	39.1	4	79	58	16.9	81	1755	3	Toyota	Starlet	4400
101	39.0	4	86	64	16.4	81	1875	1	Plymouth	Champ	3600
102	35.1	4	81	60	16.1	81	1760	3	Honda	Civic1300	4000
103	32.3	4	97	67	17.8	81	2065	3	Subaru	-	3950
104	37.0	4	85	65	19.4	81	1975	3	Datsun	210	3775
105	37.7	4	89	62	17.3	81	2050	3	Toyota	Tercel	4475
106	34.1	4	91	68	16.0	81	1985	3	Mazda	GLC 4	3975
107	34.7	4	105	63	14.9	81	2215	1	Plymouth	Horizon 4	3450
108	34.4	4	98	65	16.2	81	2045	1	Ford	Escort 4W	3850
109	29.9	4	98	65	20.7	81	2380	1	Ford	Escort 2H	4100
110	33.0	4	105	74	14.2	81	2190	2	Volkswagen	Jetta	5650
111	34.5	4	100	75	15.8	81	2320	2	Renault	18I	4600
112	33.7	4	107	75	14.4	81	2210	3	Honda	Prelude	5550
113	32.4	4	108	75	16.8	81	2350	3	Toyota	Corolla	4650
114	32.9	4	119	100	14.8	81	2615	3	Datsun	200SX	5825
115	31.6	4	120	74	18.3	81	2635	3	Mazda	626	5650
116	28.1	4	141	80	20.4	81	3230	2	Peugeot	505S DI	8500
117	25.5	4	121	80	15.4	81	2800	2	Saab	900S	8225
118	30.7	6	145	76	19.6	81	3160	2	Volvo	Diesel	8550
119	25.4	6	168	116	12.6	81	2900	3	Toyota	Cressida	9475
120	24.2	6	146	120	13.8	81	2930	3	Datsun	810 Maxima	8375
121	22.4	6	231	110	15.8	81	3415	1	Buick	Century	6675
122	26.6	8	350	105	19.0	81	3725	1	Oldsmobile	Cutlass LS	6875
123	20.2	6	200	88	17.1	81	3060	1	Ford	Granada GL	5450
124	17.6	6	225	85	16.6	81	3465	1	Chrysler	Lebaron	5625
125	28.0	4	112	88	19.6	82	2605	1	Chevrolet	Cavalier	5275
126	27.0	4	112	88	18.6	82	2640	1	Chevrolet	Cavalier SW	5500
127	34.0	4	112	88	18.0	82	2395	1	Chevrolet	Cavalier 2D	5175
128	31.0	4	112	85	16.2	82	2575	1	Pontiac	1200 Hatch	5650
129	29.0	4	135	84	16.0	82	2525	1	Dodge	Aries SE	6250
130	27.0	4	151	90	18.0	82	2735	1	Pontiac	Phoenix	5650
131	24.0	4	140	92	16.4	82	2865	1	Ford	Fairmont	5225
132	23.0	4	151	90	20.5	82	3035	1	AMC	Concord DI	5150
133	36.0	4	105	74	15.3	82	1980	2	Volkswagen	Rabbit L	5200
134	37.0	4	91	68	18.2	82	2025	3	Mazda	GLC Cst I	4900
135	31.0	4	91	68	17.6	82	1970	3	Mazda	GLC Custom	5100
136	38.0	4	105	63	14.7	82	2125	1	Plymouth	Horizon	4350
137	36.0	4	98	70	17.3	82	2125	1	Mercury	Lynx I	4550
138	36.0	4	120	88	14.5	82	2160	3	Nissan	Stanza XE	6350
139	36.0	4	107	75	14.5	82	2205	3	Honda	Accord	6500
140	34.0	4	108	70	16.9	82	2245	3	Toyota	Corolla	5425
141	38.0	4	91	67	15.0	82	1965	3	Honda	Civic M	4625
142	32.0	4	91	67	15.7	82	1965	3	Honda	Civic A	4875
143	38.0	4	91	67	16.2	82	1995	3	Datsun	310 GX	5075
144	25.0	6	181	110	16.4	82	2945	1	Buick	Century Lmt	7300
145	38.0	6	262	85	17.0	82	3015	1	Oldsmobile	Cutlass DI	7450
146	26.0	4	156	92	14.5	82	2585	1	Chrysler	Lebaron	6000
147	22.0	6	232	112	14.7	82	2835	1	Ford	Granada I	6100
148	32.0	4	144	96	13.9	82	2665	3	Toyota	Celica GT	7700
149	36.0	4	135	84	13.0	82	2370	1	Dodge	Charger 2.2	5475
150	27.0	4	151	90	17.3	82	2950	1	Chevrolet	Camaro	8400
151	27.0	4	140	86	15.6	82	2790	1	Ford	Mustang GL	5975
152	44.0	4	97	52	24.6	82	2130	2	Volkswagen	Pickup	5075

153	32.0	4	135	84	11.6	82	2295	1	Dodge	Rampage	5650
154	28.0	4	120	79	18.6	82	2625	1	Ford	Ranger	4925
155	31.0	4	119	82	19.4	82	2720	1	Chevrolet	S-10	4500

#### Úloha S4.08 Sledování nákladů nákladních vozů dle spotřeby benzínu a nafty (EDA, PCA, CLU)

Data: Sledované proměnné jsou znormované a vztaheny na 1 míli: S408i index auta, S408x1 spotřeba pohonných hmot, S408x2 náklady na opravy, S408x3 pořizovací hodnota, S408x4 druh pohonných hmot.

S408i	S408x1	S408x2	S408x3	S408x4
1	16.44	12.43	11.23	gasoline
2	7.19	2.7	3.92	gasoline
3	9.92	1.35	9.75	gasoline
4	4.24	5.78	7.78	gasoline
5	11.2	5.05	10.67	gasoline
6	14.25	5.78	9.88	gasoline
7	13.5	10.98	10.6	gasoline
8	13.32	14.27	9.45	gasoline
9	29.11	15.09	3.28	gasoline
10	12.68	7.61	10.23	gasoline
11	7.51	5.8	8.13	gasoline
12	9.9	3.63	9.13	gasoline
13	10.25	5.07	10.17	gasoline
14	11.11	6.15	7.61	gasoline
15	12.17	14.26	14.39	gasoline
16	10.24	2.59	6.09	gasoline
17	10.18	6.05	12.14	gasoline
18	8.88	2.7	12.23	gasoline
19	12.34	7.73	11.68	gasoline
20	8.51	14.02	12.01	gasoline
21	26.16	17.44	16.89	gasoline
22	12.95	8.24	7.18	gasoline
23	16.93	13.37	17.59	gasoline
24	14.7	10.78	14.58	gasoline
25	10.32	5.16	17	gasoline
26	8.98	4.49	4.26	gasoline
27	9.7	11.59	6.83	gasoline
28	12.72	8.63	5.59	gasoline
29	9.49	2.16	6.23	gasoline
30	8.22	7.95	6.72	gasoline
31	13.7	11.22	4.91	gasoline
32	8.21	9.85	8.17	gasoline
33	15.86	11.42	13.06	gasoline
34	9.18	9.18	9.49	gasoline
35	12.49	4.67	11.94	gasoline
36	17.32	6.86	4.44	gasoline
37	8.5	12.26	9.11	diesel
38	7.42	5.13	17.15	diesel
39	10.28	3.32	11.23	diesel
40	10.16	14.72	5.99	diesel
41	12.79	4.17	29.28	diesel
42	9.6	12.72	11	diesel
43	6.47	8.89	19	diesel
44	11.35	9.95	14.53	diesel
45	9.15	2.94	13.68	diesel
46	9.7	5.06	20.84	diesel
47	9.77	17.86	35.18	diesel
48	11.61	11.75	17	diesel
49	9.09	13.25	20.66	diesel
50	8.53	10.14	17.45	diesel
51	8.29	6.22	16.38	diesel
52	15.9	12.9	19.09	diesel
53	11.94	5.69	14.77	diesel
54	9.54	16.77	22.66	diesel
55	10.43	17.65	10.66	diesel
56	10.87	21.52	28.47	diesel

57	7.13	13.22	19.44	diesel
58	11.88	12.18	21.2	diesel
59	12.03	9.22	23.09	diesel

**Úloha S4.09** *Struktura a vazby burzovních akcií chemických firem (EDA, PCA, CLU) Data: S409i index týdne, S409x1 akcie firmy Allied Chemical, S409x2 akcie firmy Du Pont, S409x3 akcie firmy Union Carbide, S409x4 akcie firmy Exxon, S409x5 akcie firmy Texaco.*

S409i	S409x1	S409x2	S409x3	S409x4	S409x5
1	0	0	0	0.039473	0
2	0.027027	-0.044855	-0.00303	-0.014466	0.043478
3	0.122807	0.060773	0.088146	0.086238	0.078124
4	0.057031	0.029948	0.066808	0.013513	0.019512
5	0.06367	-0.003793	-0.039788	-0.018644	-0.024154
6	0.003521	0.050761	0.082873	0.074265	0.049504
7	-0.045614	-0.033007	0.002551	-0.009646	-0.028301
8	0.058823	0.041719	0.081425	-0.01461	0.014563
9	0	-0.019417	0.002353	0.001647	-0.028708
10	0.006944	-0.02599	0.007042	-0.041118	-0.02463
11	0.010345	0.006353	0.083916	0.010291	0
12	-0.030717	0.020202	-0.04086	-0.039049	-0.050505
13	-0.003521	0.118812	0.089686	0.06007	0.021276
14	0.060071	0.079646	0.028807	0.036666	0.026041
15	-0.003333	-0.001025	0.028	0.028938	-0.010152
16	0.055596	0.091282	0.042759	0.059375	-0.015812
17	0.051282	-0.007519	-0.041431	-0.016269	0.05851
18	-0.060976	-0.043561	0.023576	0.004566	-0.015075
19	-0.035714	0.01817	-0.021113	-0.007575	-0.010204
20	0	-0.021569	-0.007843	0.088549	0.082474
21	-0.006734	-0.01503	-0.086956	-0.021037	-0.019047
22	0	-0.017294	0.017316	0.054441	0.03398
23	0.030508	0.047619	0.055319	-0.008152	0.032863
24	0.023026	0.012846	-0.002016	0.013698	-0.031518
25	-0.061093	-0.043902	-0.042424	-0.029729	-0.014084
26	0.041096	0.016326	0.048523	0.018105	0.071428
27	-0.013158	-0.004016	-0.038229	-0.042407	-0.048888
28	0.003333	-0.008065	-0.014992	0	-0.028037
29	-0.056478	-0.014228	-0.038627	-0.005714	-0.019607
30	0.051899	0.018557	0.066964	0.020302	-0.015
31	-0.013559	-0.029352	0.012552	-0.008571	-0.010152
32	-0.037801	0.003252	-0.012397	-0.020172	-0.025641
33	-0.021429	0.031466	0.039749	0.016176	0.005263
34	-0.014599	-0.02439	-0.01006	0.004341	-0.005235
35	-0.014815	-0.020833	-0.091463	-0.007204	-0.015789
36	0.011278	-0.017021	0.064877	0.065312	0.026737
37	-0.096654	-0.075758	-0.073529	-0.053133	-0.026041
38	0.020576	0.058548	0.018141	0.063309	0.016042
39	0.08871	0.04646	0.022272	0.004059	0
40	0.007407	0.019027	0.045752	-0.008086	0.052631
41	-0.022059	0.002075	-0.017272	-0.021739	-0.045
42	-0.031579	0.010352	0.012848	-0.013888	0.010695
43	0.03937	0.054303	-0.014799	0.011428	-0.005291
44	0.015151	0.029154	-0.021459	-0.009887	-0.021276
45	0	-0.010466	0.035088	-0.014265	0.038043
46	-0.037313	-0.024038	-0.019068	-0.024602	-0.010471
47	0.015504	-0.027586	0.006479	0.022255	-0.026455
48	0.034351	0.024316	0.034335	0.020319	0.005434
49	-0.0369	0.011869	0.014523	0.007112	0.016216
50	0.068965	0.014663	0.01636	0.038135	0.063829
51	0.089606	0.079961	0.102616	0.002721	0.02
52	0	0.016949	0.029197	0.002713	0.004901
53	0.05921	0.077193	0.019504	-0.012178	0.039024
54	0.02795	0.009772	0	0	-0.000265
55	-0.004196	0.014516	-0.031696	-0.004445	-0.014354
56	0.018405	-0.0469	0.061594	-0.043235	-0.029126

57	0.069277	0.056888	0.040956	0.040816	0.02
58	-0.016901	-0.018268	-0.008197	-0.005602	-0.019607
59	-0.017192	-0.001618	-0.001653	-0.016901	0.005
60	-0.040816	-0.035656	0	0.014326	0.004975
61	-0.018237	-0.003361	-0.028146	0.03531	0.014851
62	-0.003096	-0.021922	-0.027257	0.005457	0.039024
63	0.018634	0.025862	-0.017513	0.018995	-0.004694
64	-0.057927	-0.018487	0	-0.023968	-0.037735
65	0.087379	0.049657	0.033868	0.047748	0.039215
66	0	-0.011419	-0.010345	-0.005208	0.028301
67	-0.019367	-0.011551	-0.022817	0.007853	0.013761
68	-0.046012	0.035893	0.044964	0.040612	0.004608
69	-0.07717	-0.004029	-0.003442	0.003797	-0.027522
70	0.034843	-0.008157	-0.018998	0.008827	-0.014151
71	-0.006734	-0.019737	-0.026408	0.023749	0.014354
72	-0.023729	-0.019295	-0.03255	-0.001221	0.023584
73	0.065972	0.024807	0.057944	0.020782	0.004608
74	0	-0.036728	-0.014134	-0.007185	0.004587
75	-0.052117	-0.058925	-0.069892	0.00965	0.009132
76	0.054983	-0.003683	0.026975	-0.002389	0.009049
77	-0.003257	-0.009242	-0.022514	0.005988	-0.013452
78	0.022876	0.033582	0.001919	0.02619	0.004545
79	-0.003195	-0.005415	-0.003831	-0.013921	-0.000165
80	0.04359	-0.014519	-0.013385	0.021176	0.013824
81	-0.009317	0.013812	0.021654	-0.014927	-0.00909
82	-0.056426	-0.005557	-0.003854	-0.023696	-0.018348
83	0.003322	-0.041475	-0.029014	-0.002427	-0.004672
84	0.016556	0.017308	0.033864	0.034063	0.009389
85	-0.009772	-0.016068	-0.003854	0.014117	0.013953
86	0.026316	-0.01633	-0.009671	0.032482	0.027522
87	0.009615	0.009766	0.017578	0.016247	0.017857
88	-0.047619	-0.027079	-0.051823	-0.045468	-0.021929
89	-0.026667	-0.06163	-0.05668	-0.013452	-0.040358
90	0.010274	0.023305	0.034335	-0.018181	-0.004672
91	-0.044068	0.020704	-0.006224	-0.018518	0.004694
92	0.039007	0.03854	0.024988	-0.028301	0.03271
93	-0.039457	-0.029297	-0.065844	-0.015837	-0.045758
94	0.039568	0.024145	-0.006608	0.028423	-0.009661
95	-0.031142	-0.007941	0.01108	0.007537	0.014634
96	0	-0.02008	-0.006579	0.029925	-0.004807
97	0.021429	0.04918	0.006622	-0.002421	0.028985
98	0.045454	0.046375	0.074561	0.014563	0.018779
99	0.050167	0.03638	0.004082	-0.011961	0.009216
100	0.019108	-0.033303	0.008362	0.033898	0.004566

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#### Úloha S4.10 Vícerozměrné škálování u příbuznosti míčových sportů (MDS)

Data: prvky trojúhelníkové matice vyjadřují vzdálenosti (nepodobnosti, dissimilarities) objektů dvojice sportů: S410x1 hokej, S410x2 fotbal, S410x3 košíková, S410x4 tenis, S410x5 golf, S410x6 croquet.

	S410x1	S410x2	S410x3	S410x4	S410x5	S410x6
S410x1	0					
S410x2	2	0				
S410x3	3	3	0			
S410x4	4	5	5	0		
S410x5	5	6	4	4	0	
S410x6	5	5	6	3	2	0

#### Úloha S4.11 Vícerozměrné škálování u podobnosti aktivit k osobní relaxaci (MDS)

Data: prvky trojúhelníkové matice vyjadřují vzdálenosti (nepodobnosti) objektů dvojice aktivit relaxace: x1 značí S411x1 a znamená koncert, S411x2 museum, S411x3 divadlo, S411x4 kino, S411x5 TV, S411x6 konference, S411x7 četba, S411x8 divák hokeje, S411x9 balet, S411x10 politika, S411x11 móda, S411x12 dokumentaristika, S411x13 výstavy, S411x14 nákupy, S411x15 restaurace.

	S411x1	S411x2	S411x3	S411x4	S411x5	S411x6	S411x7	S411x8	S411x9	S411x10	S411x11	S411x12	S411x13	S411x14	S411x15
S411x1	-														
S411x2	16	-													
S411x3	3	18	-												
S411x4	12	12	11	-											
S411x5	15	21	16	2	-										
S411x6	20	10	19	15	12	-									
S411x7	15	12	13	9	19	6	-								
S411x8	21	23	23	19	7	22	20	-							
S411x9	7	10	6	18	19	25	15	25	-						
S411x10	19	22	25	22	14	8	22	23	25	-					
S411x11	9	7	13	15	12	19	20	22	8	25	-				
S411x12	22	16	16	19	13	7	13	15	23	13	25	-			
S411x13	7	3	13	12	21	13	10	22	13	12	7	18	-		
S411x14	21	22	22	12	23	21	18	18	21	22	9	22	12	-	
S411x15	8	8	7	9	21	21	2	22	5	25	9	23	10	8	-

#### Úloha S4.12 Skryté vazby mezi traťovými rekordy v lehké atletice žen (PCA, CLU)

Data: S412i index sportovce, S412x1 běh na 100 m [s], S412x2 běh na 200 m [s], S412x3 běh na 400 m [s], S412x4 běh na 800 m [min], S412x5 běh na 1500 m [min], S412x6 běh na 3000 m [min], S412x7 maraton [min], S412x8 země původu sportovce.

S412i	S412x1	S412x2	S412x3	S412x4	S412x5	S412x6	S412x7	S412x8
1	11.61	22.94	54.50	2.15	4.43	9.79	178.52	argentin
2	11.20	22.35	51.08	1.98	4.13	9.08	152.37	australi
3	11.43	23.09	50.62	1.99	4.22	9.34	159.37	austria
4	11.41	23.04	52.00	2.00	4.14	8.88	157.85	belgium
5	11.46	23.05	53.30	2.16	4.58	9.81	169.98	bermuda
6	11.31	23.17	52.80	2.10	4.49	9.77	168.75	brazil
7	12.14	24.47	55.00	2.18	4.45	9.51	191.02	burma
8	11.00	22.25	50.06	2.00	4.06	8.81	149.45	canada
9	12.00	24.52	54.90	2.05	4.23	9.37	171.38	chile
10	11.95	24.41	54.97	2.08	4.33	9.31	168.48	china
11	11.60	24.00	53.26	2.11	4.35	9.46	165.42	columbia
12	12.90	27.10	60.40	2.30	4.84	11.10	233.22	cookis
13	11.96	24.60	58.25	2.21	4.68	10.43	171.80	costa
14	11.09	21.97	47.99	1.89	4.14	8.92	158.85	czech
15	11.42	23.52	53.60	2.03	4.18	8.71	151.75	denmark
16	11.79	24.05	56.05	2.24	4.74	9.89	203.88	domrep
17	11.13	22.39	50.14	2.03	4.10	8.92	154.23	finland
18	11.15	22.59	51.73	2.00	4.14	8.98	155.27	france
19	10.81	21.71	48.16	1.93	3.96	8.75	157.68	gdr
20	11.01	22.39	49.75	1.95	4.03	8.59	148.53	frg
21	11.00	22.13	50.46	1.98	4.03	8.62	149.72	gbni
22	11.79	24.08	54.93	2.07	4.35	9.87	182.20	greece
23	11.84	24.54	56.09	2.28	4.86	10.54	215.08	guatemal
24	11.45	23.06	51.50	2.01	4.14	8.98	156.37	hungary
25	11.95	24.28	53.60	2.10	4.32	9.98	188.03	india
26	11.85	24.24	55.34	2.22	4.61	10.02	201.28	indonesi
27	11.43	23.51	53.24	2.05	4.11	8.89	149.38	ireland
28	11.45	23.57	54.90	2.10	4.25	9.37	160.48	israel
29	11.29	23.00	52.01	1.96	3.98	8.63	151.82	italy

30	11.73	24.00	53.73	2.09	4.35	9.20	150.50	japan
31	11.73	23.88	52.70	2.00	4.15	9.20	181.05	kenya
32	11.96	24.49	55.70	2.15	4.42	9.62	164.65	korea
33	12.25	25.78	51.20	1.97	4.25	9.35	179.17	dprkorea
34	12.03	24.96	56.10	2.07	4.38	9.64	174.68	luxembou
35	12.23	24.21	55.09	2.19	4.69	10.46	182.17	malaysia
36	11.76	25.08	58.10	2.27	4.79	10.90	261.13	mauritiu
37	11.89	23.62	53.76	2.04	4.25	9.59	158.53	mexico
38	11.25	22.81	52.38	1.99	4.06	9.01	152.48	netherla
39	11.55	23.13	51.60	2.02	4.18	8.76	145.48	nz
40	11.58	23.31	53.12	2.03	4.01	8.53	145.48	norway
41	12.25	25.07	56.96	2.24	4.84	10.69	233.00	png
42	11.76	23.54	54.60	2.19	4.60	10.16	200.37	philippi
43	11.13	22.21	49.29	1.95	3.99	8.97	160.82	poland
44	11.81	24.22	54.30	2.09	4.16	8.84	151.20	portugal
45	11.44	23.46	51.20	1.92	3.96	8.53	165.45	rumania
46	12.30	25.00	55.08	2.12	4.52	9.94	182.77	singapor
47	11.80	23.98	53.59	2.05	4.14	9.02	162.60	spain
48	11.16	22.82	51.79	2.02	4.12	8.84	154.48	sweden
49	11.45	23.31	53.11	2.02	4.07	8.77	153.42	switzerl
50	11.22	22.62	52.50	2.10	4.38	9.63	177.87	taipei
51	11.75	24.46	55.80	2.20	4.72	10.28	168.45	thailand
52	11.98	24.44	56.45	2.15	4.37	9.38	201.08	turkey
53	10.79	21.83	50.62	1.96	3.95	8.50	142.72	usa
54	11.06	22.19	49.19	1.89	3.87	8.45	151.22	ussr
55	12.74	25.85	58.73	2.33	5.81	13.04	306.00	wsamoa

#### Úloha S4.13 Skryté vazby mezi traťovými rekordy v lehké atletice mužů (PCA, CLU)

Data: S413i index sportovce, S413x1 běh na 100 m [s], S413x2 běh na 200 m [s], S413x3 běh na 400 m [s], S413x4 běh na 800 m [min], S413x5 běh na 1500 m [min], S413x6 běh na 5000 m [min], S413x7 běh na 10000 m [min], S413x8 maraton [min], S413x9 země původu sportovce.

S413i	S413x1	S413x2	S413x3	S413x4	S413x5	S413x6	S413x7	S413x8	S413x9
1	10.39	20.81	46.84	1.81	3.70	14.04	29.36	137.72	argentin
2	10.31	20.06	44.84	1.74	3.57	13.28	27.66	128.30	australi
3	10.44	20.81	46.82	1.79	3.60	13.26	27.72	135.90	austria
4	10.34	20.68	45.04	1.73	3.60	13.22	27.45	129.95	belgium
5	10.28	20.58	45.91	1.80	3.75	14.68	30.55	146.62	bermuda
6	10.22	20.43	45.21	1.73	3.66	13.62	28.62	133.13	brazil
7	10.64	21.52	48.30	1.80	3.85	14.45	30.28	139.95	burma
8	10.17	20.22	45.68	1.76	3.63	13.55	28.09	130.15	canada
9	10.34	20.80	46.20	1.79	3.71	13.61	29.30	134.03	chile
10	10.51	21.04	47.30	1.81	3.73	13.90	29.13	133.53	china
11	10.43	21.05	46.10	1.82	3.74	13.49	27.88	131.35	columbia
12	12.18	23.20	52.94	2.02	4.24	16.70	35.38	164.70	cookis
13	10.94	21.90	48.66	1.87	3.84	14.03	28.81	136.58	costa
14	10.35	20.65	45.64	1.76	3.58	13.42	28.19	134.32	czech
15	10.56	20.52	45.89	1.78	3.61	13.50	28.11	130.78	denmark
16	10.14	20.65	46.80	1.82	3.82	14.91	31.45	154.12	domrep
17	10.43	20.69	45.49	1.74	3.61	13.27	27.52	130.87	finland
18	10.11	20.38	45.28	1.73	3.57	13.34	27.97	132.30	france
19	10.12	20.33	44.87	1.73	3.56	13.17	27.42	129.92	gdr
20	10.16	20.37	44.50	1.73	3.53	13.21	27.61	132.23	frg
21	10.11	20.21	44.93	1.70	3.51	13.01	27.51	129.13	gbni
22	10.22	20.71	46.56	1.78	3.64	14.59	28.45	134.60	greece
23	10.98	21.82	48.40	1.89	3.80	14.16	30.11	139.33	guatemala
24	10.26	20.62	46.02	1.77	3.62	13.49	28.44	132.58	hungary
25	10.60	21.42	45.73	1.76	3.73	13.77	28.81	131.98	india
26	10.59	21.49	47.80	1.84	3.92	14.73	30.79	148.83	indonesi
27	10.61	20.96	46.30	1.79	3.56	13.32	27.81	132.35	ireland
28	10.71	21.00	47.80	1.77	3.72	13.66	28.93	137.55	israel
29	10.01	19.72	45.26	1.73	3.60	13.23	27.52	131.08	italy
30	10.34	20.81	45.86	1.79	3.64	13.41	27.72	128.63	japan
31	10.46	20.66	44.92	1.73	3.55	13.10	27.38	129.75	kenya
32	10.34	20.89	46.90	1.79	3.77	13.96	29.23	136.25	korea
33	10.91	21.94	47.30	1.85	3.77	14.13	29.67	130.87	dprkorea

34	10.35	20.77	47.40	1.82	3.67	13.64	29.08	141.27	luxembou
35	10.40	20.92	46.30	1.82	3.80	14.64	31.01	154.10	malaysia
36	11.19	22.45	47.70	1.88	3.83	15.06	31.77	152.23	mauritiu
37	10.42	21.30	46.10	1.80	3.65	13.46	27.95	129.20	mexico
38	10.52	20.95	45.10	1.74	3.62	13.36	27.61	129.02	netherla
39	10.51	20.88	46.10	1.74	3.54	13.21	27.70	128.98	nz
40	10.55	21.16	46.71	1.76	3.62	13.34	27.69	131.48	norway
41	10.96	21.78	47.90	1.90	4.01	14.72	31.36	148.22	png
42	10.78	21.64	46.24	1.81	3.83	14.74	30.64	145.27	philippi
43	10.16	20.24	45.36	1.76	3.60	13.29	27.89	131.58	poland
44	10.53	21.17	46.70	1.79	3.62	13.13	27.38	128.65	portugal
45	10.41	20.98	45.87	1.76	3.64	13.25	27.67	132.50	rumania
46	10.38	21.28	47.40	1.88	3.89	15.11	31.32	157.77	singapor
47	10.42	20.77	45.98	1.76	3.55	13.31	27.73	131.57	spain
48	10.25	20.61	45.63	1.77	3.61	13.29	27.94	130.63	sweden
49	10.37	20.46	45.78	1.78	3.55	13.22	27.91	131.20	switzerl
50	10.59	21.29	46.80	1.79	3.77	14.07	30.07	139.27	taipei
51	10.39	21.09	47.91	1.83	3.84	15.23	32.56	149.90	thailand
52	10.71	21.43	47.60	1.79	3.67	13.56	28.58	131.50	turkey
53	9.93	19.75	43.86	1.73	3.53	13.20	27.43	128.22	usa
54	10.07	20.00	44.60	1.75	3.59	13.20	27.53	130.55	ussr
55	10.82	21.86	49.00	2.02	4.24	16.28	34.71	161.83	wsamao

#### Úloha S4.14 Struktura a skryté vazby ve vlastnostech planetárních těles sluneční soustavy

Data:  $S414i$  značí index planetového objektu,  $S414j$  název planetového objektu,  $S414x1$  rozměr 1 [km],  $S414x2$  rozměr 2 [km],  $S414x3$  rozměr 3 [km],  $S414x4$  hmotnost [teratuny],  $S414x5$  délka dne [hodiny],  $S414x6$  délka roku [dny],  $S414x7$  počet měsíců.

$S414i$	$S414j$	$S414x1$	$S414x2$	$S414x3$	$S414x4$	$S414x5$	$S414x6$	$S414x7$
1	Merkur	4878	4878	4878	330000000	1407.6	87.97	0
2	Venuše	12104	12104	12104	4870000000	5832	224.7	0
3	Země	12756	12714	12714	5980000000	24	365.25	1
4	Mars	6787	6746	6746	642000000	24.624	686.98	2
5	Jupiter	142800	133659	133659	1.9E+12	9.8	4331.87	16
6	Saturn	120660	107812	107812	5.69E+11	10.2	10760.27	20
7	Uran	51118	49949	49949	86800000000	17.9	30681	15
8	Neptun	49528	48203	48203	1.02E+11	19.1	60193.2	8
9	Pluto	2300	2300	2300	12900000	6.39	90472.43	1
10	Ceres	960	932	932	870000	9.075	1680.15	0
11	Pallas	570	525	482	318000	7.811	1683.8	0
12	Juno	240	240	240	20000	7.21	1592.49	0
13	Vesta	530	530	530	300000	5.342	1325.86	0
14	Eugenia	226	226	226	6100	5.699	1639.97	0
15	Siwa	103	103	103	1500	18.5	1647.28	0
16	Ida	58	23	23	100	4.633	1767.81	0
17	Mathilde	66	48	46	103.3	417.7	1574.23	0
18	Eros	33	13	13	6.69	5.27	642.84	0
19	Gaspra	19	12	11	10	7.042	1201.67	0
20	Icarus	1.4	1.4	1.4	0.001	2.273	409.08	0
21	Geographos	2	2	2	0.004	5.222	507.7	0
22	Apollo	1.6	1.6	1.6	0.002	3.063	661.1	0
23	Chiron	180	180	180	4000	5.9	18518.18	0
24	Toutatis	4.6	2.4	1.9	0.05	130	1453.7	0

**Úloha S4.15** *Struktura ve známkách na vysvědčení žáků (FACT)**Data: S415x1* franština, *S415x2* angličtina, *S415x3* dějepis, *S415x4* aritmetika, *S415x5* algebra, *S415x6* geometrie.

	<i>S415x1</i>	<i>S415x2</i>	<i>S415x3</i>	<i>S415x4</i>	<i>S415x5</i>	<i>S415x6</i>
<i>S415x1</i>	1					
<i>S415x2</i>	0.44	1				
<i>S415x3</i>	0.41	0.35	1			
<i>S415x4</i>	0.29	0.35	0.16	1		
<i>S415x5</i>	0.33	0.32	0.19	0.59	1	
<i>S415x6</i>	0.25	0.33	0.18	0.47	0.46	1

**Úloha S4.16** *Shluky 12 superhvězd košíkové (CLU)**Data:*  databáze hráčů košíkové obsahuje tyto proměnné: *S416i* značí index hráče, *S416j* značí jméno hráče, *S416x1* značí výška hráče [palce], *S416x2* značí hmotnost [libry], *S416x3* značí FgPct, *S416x4* značí FtPct, *S416x5* značí počet dosažených bodů, *S416x6* značí počet doskoků, *S416x7* značí počet asistencí, *S416x8* značí počet faulů.

	<i>S416i</i>	<i>S416x1</i>	<i>S416x2</i>	<i>S416x3</i>	<i>S416x4</i>	<i>S416x5</i>	<i>S416x6</i>	<i>S416x7</i>	<i>S416x8</i>
1. Jabbar K.A.	86	230	55.9	72.1	24.6	11.2	3.6	3	
2. Barry R	79	205	44.9	90	23.2	6.7	4.9	3	
3. Baylor E	77	225	43.1	78	27.4	13.5	4.3	3.1	
4. Bird L	81	220	50.3	88	25	10.2	6.1	2.7	
5. Chamberlain W	85	275	54	51.1	30.1	22.9	4.4	2	
6. Cousy B	72.5	175	37.5	80.3	18.4	5.2	7.5	2.4	
7. Erving J	78.5	200	50.6	77.8	24.2	8.5	4.2	2.8	
8. Johnson M	81	215	53	83.4	19.5	7.4	11.2	2.4	
9. Jordan M	78	195	51.3	84.8	32.6	6.2	5.9	3.1	
10. Robertson O	77	210	48.5	83.8	25.7	7.5	9.5	2.8	
11. Russell B	81.5	220	44	56.1	15.1	22.6	4.3	2.7	
12. West J	74.5	180	47.4	81.4	27	5.8	6.7	2.6	

**Úloha S4.17** *Shluky jednotlivých barev na paletě (CLU)**Data: S417i* je index barvy, *S417x1* je podíl červené (Red), *S417x2* je podíl modré (Blue).

	<i>S417i</i>	<i>S417x1</i>	<i>S417x2</i>
	1	1	9
	2	2	10
	3	2	9
	4	2	8
	5	3	9
	6	7	14
	7	12	9
	8	13	10
	9	13	8
	10	14	10
	11	14	8
	12	15	9
	13	7	7
	14	6	3
	15	7	3
	16	8	3
	17	6	2
	18	7	2
	19	8	2
	20	6	1
	21	7	1
	22	8	1

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<i>S418x1</i>	<i>S418x2</i>	<i>S418x3</i>	<i>S418x4</i>	<i>S418x5</i>	<i>S418y</i>
83	34	65	63	64	106
73	19	73	48	82	92
54	81	82	65	73	102
96	72	91	88	94	121
84	53	72	68	82	102
86	72	63	79	57	105
76	62	64	69	64	97
54	49	43	52	84	92
37	43	92	39	72	94
42	54	96	48	83	112
71	63	52	69	42	130
63	74	74	71	91	115
69	81	82	75	54	98
81	89	64	85	62	96
50	75	72	64	45	103

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