Statistik I - Exercise session 2
25.04.2017

Preliminary schedule:

Date	Week	Exercises
18.04.2017	E1	1-1-c,e,g,i,k ; 1-2-a,b,d ; 1-3 ; 1-4 ; 1-5-a,b ; 1-6
25.04.2017	E2	1-7-C,D ; 1-8 ; 1-9-B; 1-10-A(a..e), 1-10-B(a,b,c) ; 1-11-a,b
02.05.2017	E3	2-1; 2-2; 2-3; 2-7
09.05.2017	E4	2-9; 2-19, 2-20
16.05.2017	E5	TBA
23.05.2017	E6	TBA
30.05.2017	E7	TBA
06.06.2017	E8	TBA
13.06.2017	E8	TBA
20.06.2017	E9	TBA
27.06.2017	E10	TBA
04.07.2017	E11	TBA
11.07.2017	E12	TBA
18.07.2017	E13	TBA

Review

- Mathematical background: Function, Derivative, Integral.

Exercises

E1-7-C
Identify the terms that are part of the sum. Determine and specify which subterms depend on the run index. Rewrtie the totals for verification without using the totals sign $\sum$ and simplify it if possible.

a) $\sum_{i=1}^{n} x_i^2$

b) $\sum_{i=1}^{n} a_i^{i-1}$

c) $\sum_{i=1}^{n} x_i - 1$

d) $\sum_{i=1}^{n} (a_i + 3)$

e) $\sum_{i=1}^{n} |x_i - y_i|$

f) $\frac{1}{n} \sum_{i=1}^{n} a x_i$

g) $\sum_{i=1}^{n} x_i y_i$

h) $\sum_{i=1}^{n} x_i \sum_{j=1}^{m} y_j$

i) $\sum_{i=1}^{n} \sum_{j=1}^{m} x_i y_j$

j) $\left(\sum_{i=1}^{n} x_i\right)^2$

E1-7-D
Split the following expressions in a way that the summed terms (inside the $\sum$) do not contain any addition.

a) $\sum_{i=1}^{n} (x_i^2 + y_i^2)$

b) $\sum_{i=1}^{n} (x_i + y_i)^2$

c) $\sum_{i=1}^{n} (x_i - y_i)^2$

d) $\sum_{i=1}^{n} (x_i - \mu)^2$

e) $\sum_{i=1}^{n} (x_i + y_i)(x_i - y_i)$

f) $\sum_{i=1}^{n} (a x_i + b x_i + a y_i - b y_i)$

E1-8
Compute:

a) $\binom{24}{21}$ b) $\binom{6}{0}$ c) $\binom{10}{2}$ d) $\binom{0}{0}$

E1-9-B

a) $\lim_{x\to -1} \frac{x^2+2x+1}{x^2-x-2}$ b) $\lim_{x\to 3} \frac{x^2-9}{x^2-2x-3}$ c) $\lim_{x\to 0} x^{-1}\log x$

E1-10-A
State the 1st derivative of:

a) $f(x) = 8x^2 + e^x$

b) $f(x) = e^{x^3} + 1$

c) $f(x) = 3x\log x$

d) $f(x) = \frac{(x+1)^2}{1-x^2}$

e) $f(x) = xe^{x^2}$

E1-10-B

State the partial derivative of:

a) $\frac{\partial}{\partial\alpha}\sum_{i=1}^{n}\left(x_i + \alpha x_i^2 - a^2 x_i y_i\right)$

b) $\frac{\partial}{\partial\alpha}\sum_{i=1}^{n}\left(x_i - \alpha\right)^2$

c) $\frac{\partial}{\partial\alpha}\sum_{i=1}^{n}\left(\alpha x_i + \beta\right)^2$

E1-11-A

Compute:

a) $\int_0^5 x^4 dx$

b) $\int_0^1 e^x(e^{-x} - 1)dx$

c) $\int_e^{e^2}\left(\frac{1}{x} + 1\right)dx$

E1-11-B

Find the antiderivative/primitive function for:

a) $f(x) = e^{logx}$

b) $f(x) = \frac{1}{x^3} + 4x^5 + x^7$

c) $f(x) = e^{3x}$