

TEORIE

$$1. \sigma(x) \leq \left| \frac{x - \bar{x}}{x} \right| \cdot 100$$

$$2. \alpha_1 = 0,5 \cdot 10^{-2}$$

$$\alpha_2 = 0,5 \cdot 10^{-3}$$

$$\rho_{CH} = \frac{\partial f}{\partial x_1} (x_1, x_2) \cdot 0,5 \cdot 10^{-2} \cdot \frac{\partial f}{\partial x_1} (x_1, x_2) \cdot 0,5 \cdot 10^{-3}$$

$$3. \|A\|_F = \sqrt{0^2 + 2^2 + 4^2 + 3^2 + 1^2 + 0^2} = 6$$

$$4. (y - y_1)' \rightarrow y' = y_1' = y_2$$

$$(y' - y_2)' \rightarrow y'' = y_2'$$

$$\text{Dit: } y_2' + 8 \sin x \cdot y_2 - y_1 = \cos 2x$$

$$y_2' - y_1 - y_2 \cdot \sin x + \cos 2x$$

$$y' = \begin{pmatrix} 0 & 1 \\ 1 & -\sin x \end{pmatrix} y + \begin{pmatrix} 0 \\ \cos 2x \end{pmatrix}$$

5. Lomaxen carbox

$$\begin{cases} 5x_1 + x_2 - x_3 = 2 \Rightarrow x_1 = (-x_2 + x_3 + 2) \cdot \frac{1}{5} \\ x_1 - 7x_2 + x_3 = 4 \Rightarrow x_1 = (-x_2 - x_3 + 4) \cdot \left(-\frac{1}{7}\right) \\ 2x_1 - x_2 - 4x_3 = 0 \Rightarrow x_1 = (-2x_1 + x_2) \cdot \left(-\frac{1}{4}\right) \end{cases} \Rightarrow \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 0 & -1/5 & 1/5 \\ 1/7 & 0 & 1/7 \\ 1/2 & -1/4 & 0 \end{pmatrix} \begin{pmatrix} x_1^{(k)} \\ x_2^{(k)} \\ x_3^{(k)} \end{pmatrix} + \begin{pmatrix} 2/5 \\ -4/7 \\ 0 \end{pmatrix}$$

0	[0 ^A , 0 ^B , 0 ^C]
1	[2/5 ^D , -1/7 ^E , 0 ^F]
2	[18/35 ^A , -18/35 ^B , 12/35 ^C]
3	[4/7, -22/49, 27/70]

② $q_0 = 1000\,000 \text{ €}$ $\text{nomi } 5\% \text{ opeis}$
 $n=6$
 $a) q_6 = q_0 \left(1 - \frac{15}{100}\right)^6 = 1000\,000 \cdot 0,85^6 = 377\,149,5156$

b) $q_n = q_0 \left(1 - \frac{15}{100}\right)^n$

$x = 377\,149,5156$ $\delta(x) = \left| \frac{377\,100 - 377\,149,5156}{377\,149,5156} \right| \cdot 100 = 0,013129 \Rightarrow \underline{0,01\%}$
 $\bar{x} = 377\,100$

$100\,000 = 1000\,000 (0,85)^n$
 $0,1 = 0,85^n$

③ $4e^x - xe^x = 2$
 $f(x) = 4e^x - xe^x - 2$
 $f'(x) = 4e^x - (e^x + xe^x) = 3e^x - xe^x$
 $f''(x) = 3e^x - (e^x + xe^x) = 2e^x - xe^x$
 $x_0 = 4$
 $x_1 = 3,963\,368\,722$
 $x_2 = 3,961\,950\,023$
 $x_3 = 3,961\,947\,968$ pb
 $x_4 = 3,961\,947\,968$

$\ln 0,1 = n \cdot \ln 0,85 \Rightarrow n = \frac{\ln 0,1}{\ln 0,85} = 14,2 = 15$

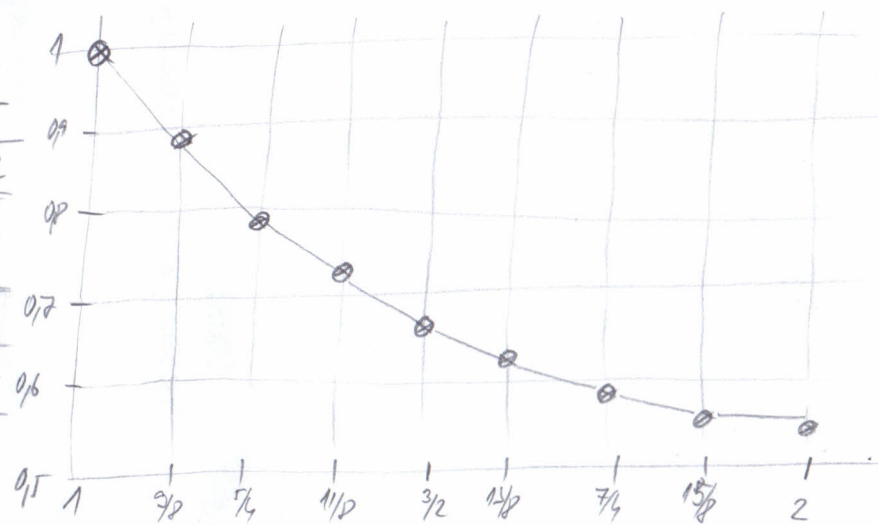
IV: $x_{k+1} = x_k - \frac{4e^{x_k} - x_k e^{x_k} - 2}{3e^{x_k} - x_k e^{x_k}}$

⑤ $x_0 < 1/12$ $n=8$ $g' = \frac{g^2 \ln x - g}{x}$; $g(1) = 1$
 $h = \frac{2-1}{8} = \frac{1}{8}$

$g_{i+1} = g_i + h \left(\frac{g_i^2 \ln x_i - g_i}{x_i} \right) = \left(B + \frac{B^2 \ln A - B}{8A} \right)$

x	f(x)	Δ_1	Δ_2	Δ_3	Δ_4
-2	①	$\frac{1-0}{1-(-2)} = \frac{1}{3}$ ①	$\frac{1-1}{0-(-2)} = \frac{0}{2} = 0$ ①	$\frac{-\frac{1}{3}-0}{1-(-2)} = \frac{-1/3}{3} = -1/9$	$\frac{1/3-(-1/9)}{2-(-2)} = \frac{4/9}{4} = 1/9$
-1	1	$\frac{2-1}{0-(-1)} = 1$	$\frac{-2-1}{1-(-1)} = \frac{-3}{2} = -1,5$	$\frac{1-(-1,5)}{2-(-1)} = \frac{2,5}{3}$	$\frac{-1,5-2,5/3}{4-(-1)} = \frac{-1,5-5/6}{5} = \frac{-13/6}{5} = -11/30$
0	2	$\frac{0-2}{1-0} = -2$	$\frac{1-(-2)}{2-(-1)} = \frac{3}{3} = 1$	$\frac{1-1}{4-(-1)} = \frac{0}{5} = 0$	$\frac{1-0}{5-0} = \frac{1}{5}$
1	0	$\frac{3-0}{2-1} = 3$	$\frac{2-0}{3-2} = 2$	$\frac{2-2}{4-3} = 0$	$\frac{2-0}{4-1} = \frac{2}{3}$
2	3				

x_i ①	g_i ②
1	1
9/8	0,875
10/8	0,787 797 5152
11/8	0,722 866 6088
12/8	0,672 279 0607
13/8	0,631 526 944
14/8	0,597 842 8152
15/8	0,569 425 5999
16/8	0,545 053 1004



$N_4(x) = 1(x+2) + 0(x+2)(x+1) - \frac{1}{2}(x+2)(x+1)x + \frac{11}{24}(x+2)(x+1)(x)(x-1)$
 $= 1(x+2) + 0(x^2+3x+2) - \frac{1}{2}(x^2+3x+2x) + \frac{11}{24}(x^4+2x^3-x^2-2x) = \frac{11}{24}x^4 + \frac{5}{12}x^3 - \frac{47}{24}x^2 - \frac{11}{12}x + 2$