ZI 2010.

1. ?

2. ZAŠTITNA ZNAMENKA ODNOSI SE NA ODUZIMANJE. UNOSI DODATNU ZNAMENKU U ODUZIMANJE I TIME SMANJUJE RELATIVNU GREŠKU.

3. ?

4. ?

5. $x_0 = 0$ $h = 2$ r pz: $[-32, -8]$

x_0	0	-2	-4	-8	-16	-32	-64
$f(x_0)$		>	>	>	>	<	<

a) $g(2) < g(-2)$ NETOČNO

b) $g(-5) > g(-10)$ TOČNO

c) $g(-10) > g(10)$ NETOČNO

d) $g(0) < g(-30)$ NE MOŽE SE ODREDITI

6.
$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 3 & 2 & 1 & 4 \\ 1 & 3 & 2 & 4 \\ 1 & 4 & 2 & 3 \end{bmatrix} \Rightarrow \begin{bmatrix} 3 & 2 & 1 & 4 \\ 1 & 2 & 3 & 4 \\ 1 & 3 & 2 & 4 \\ 1 & 4 & 2 & 3 \end{bmatrix} \Rightarrow \begin{bmatrix} 3 & 2 & 1 & 4 \\ 1/3 & 4/3 & 8/3 & 8/3 \\ 1/3 & 7/3 & 5/3 & 8/3 \\ 1/3 & 10/3 & 5/3 & 5/3 \end{bmatrix}$$

$$V = \begin{bmatrix} 1 & 2 & 2 & 2 \\ 2 & 1 & 4 & 4 \\ 3 & 3 & 3 & 1 \\ 4 & 4 & 1 & 3 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 2 & 1 & 4 \\ 1/3 & 10/3 & 5/3 & 5/3 \\ 1/3 & 7/3 & 5/3 & 8/3 \\ 1/3 & 4/3 & 8/3 & 8/3 \end{bmatrix} \Rightarrow \begin{bmatrix} 3 & 2 & 1 & 4 \\ 1/3 & \frac{10}{3} & 5/3 & 5/3 \\ 1/3 & 7/10 & 1/2 & 3/2 \\ 1/3 & 4/10 & 2 & 2 \end{bmatrix}$$

$\frac{5}{3} \cdot \frac{7}{10} = \frac{7}{6}$ $\frac{5}{3} = \frac{10}{6} - \frac{7}{6} = \frac{3}{6} = \frac{1}{2}$

$\frac{4}{10} \cdot \frac{5}{3} = \frac{4}{6}$ $\frac{16}{6} - \frac{4}{6} = \frac{12}{6} = 2$

$\frac{16}{6} - \frac{7}{6} = \frac{9}{6} = \frac{3}{2}$

$\frac{16}{6} - \frac{4}{10} \cdot \frac{5}{3} = \frac{16}{6} - \frac{2}{3} = \frac{8}{3} - \frac{2}{3} = \frac{6}{3} = 2$

$\frac{3}{2} - \frac{2}{4} = \frac{3}{2} - \frac{1}{2} = \frac{2}{2} = 1$

$$\begin{bmatrix} 3 & 2 & 1 & 4 \\ 1/3 & 10/3 & 5/3 & 5/3 \\ 1/3 & 2/5 & 2 & 2 \\ 1/3 & 7/10 & 1/4 & 3/2 \end{bmatrix} \Rightarrow \begin{bmatrix} 3 & 2 & 1 & 4 \\ \frac{1}{3} & \frac{10}{3} & \frac{5}{3} & \frac{5}{3} \\ \frac{1}{3} & \frac{2}{5} & 2 & 2 \\ \frac{1}{3} & \frac{7}{10} & \frac{1}{4} & 1 \end{bmatrix}$$

$$V = \begin{bmatrix} 2 \\ 4 \\ 1 \\ 3 \end{bmatrix}$$

ZI 2010.

7. BILO NA 1.MI (NEĆE OPET)

8. ?

9. GA

$x_1 \in [-1, 1]$ $\quad x_2 = [0, 10]$ $\quad$ PRECIZNOST = 2 DECIMALE

$\Downarrow$

≈ 200 VRIJEDNOSTI $\qquad \approx 1000$ VRIJEDNOST

$2^8 = 256$ ✓ $\qquad 2^{10} = 1024$ ✓

8 BITOVA ZA x_1 $\qquad$ 10 BITOVA ZA x_2 $\qquad$ UKUPNO 18 BITOVA

1012	0
506	0
253	1
126	0
63	1
31	1
15	1
7	1
3	1
1	1
0	

$$b = \frac{x - dg}{gg - dg} \cdot (2^n - 1)$$

$(-1, 5)$

= 0000 0000 01111 11111

ZA −1: $b = \frac{-1+1}{1+1} \cdot 2^8 - 1 = 0000\ 0000$

ZA 5: $b = \frac{5-0}{10-0} \cdot (2^{10} - 1) = \frac{1}{2} \cdot 1023 = 511.5 = 01111\ 1111$

$(0, 9.9)$

= 0111 1111 11111 10100

ZA 0: $b = \frac{0+1}{1+1} \cdot (2^8 - 1) = \frac{1}{2} \cdot 255 = 127.5 = 0111\ 1111$

ZA 9.9: $b = \frac{9.9 - 0}{10 - 0} \cdot (2^{10} - 1) = 0.99 \cdot 1023 = 1012.77 = 11111\ 10100$

KRIŽANJE:

$xy + R \cdot (x \oplus y)$

	0000	0000	01111	11111
	0111	1111	11111	10100
$\cdot$	0000	0000	01111	10100
$\oplus$	0111	1111	10000	01011
+	0111	1111	11111	11111

0111 1111 : $x = -1 + \frac{127}{255} \cdot 2 = -1 + 0.996 \approx 0$

11111 11111 : $x = 0 + \frac{1023}{1023} \cdot 10 = 10$

$\underline{(0, 10)}$

$p_m = 0.005$

VJEROJATNOST DA ĆE BAREM JEDAN BIT U KROMOSOMU BITI MUTIRAN?

$p_x = ?$

$$p_x = 1 - \underbrace{(1 - p_m)^n}_{\text{VJEROJATNOST DA NI JEDAN BIT NEĆE BITI MUTIRAN}}$$

$$p_x = 1 - (1 - 0.005)^{18} = 0.086275 \approx \underline{8.63\ \%}$$

Z1 2010.

10. DVIJE ITERACIJE NEWTON-RAPHSONOVOG POSTUPKA

$\underline{x}_0 = (0,0)$

$$x_1^2 - 2x_2 + 1 = 0 \quad \rightarrow g_1(x)$$
$$2x_1 + x_2^2 - 2 = 0 \quad \rightarrow g_2(x)$$

$$\underline{J} = \begin{bmatrix} 2x_1 & -2 \\ 2 & 2x_2 \end{bmatrix} \qquad \underline{x}_0 = (0,0)$$

i) $\underline{J} \cdot \underline{\Delta x} = -G = \begin{bmatrix} 2\cdot 0 & -2 \\ 2 & 2\cdot 0 \end{bmatrix} \cdot \begin{bmatrix} \Delta x_1 \\ \Delta x_2 \end{bmatrix} = \begin{bmatrix} -1 \\ 2 \end{bmatrix}$ $\quad -2\Delta x_2 = -1 \quad \underline{\Delta x_2 = \frac{1}{2}}$ $\quad 2\Delta x_1 = 2 \quad \underline{\Delta x_1 = 1}$

$\underline{x}_1 = (1, \frac{1}{2})$

ii) $\begin{bmatrix} 2 & -2 \\ 2 & 1 \end{bmatrix} \cdot \begin{bmatrix} \Delta x_1 \\ \Delta x_2 \end{bmatrix} = \begin{bmatrix} -1 \\ -\frac{1}{4} \end{bmatrix}$

$$-2\Delta x_1 + 2\Delta x_2 = +1$$
$$2\Delta x_1 + \Delta x_2 = -\frac{1}{4}$$
$$+ \quad 3\Delta x_2 = \frac{3}{4}$$

$2\Delta x_1 + \frac{1}{4} = -\frac{1}{4}$

$2\Delta x_1 = -\frac{2}{4}$

$\underline{\Delta x_2 = \frac{1}{4}} \qquad \underline{\Delta x_1 = -\frac{1}{4}}$

$\underline{x}_2 = \left(\frac{3}{4}, \frac{3}{4}\right)$

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11. $F(\underline{x}) = (x_1 - 15)^2 + (x_2 - 15)^2$ FIBBONACCIJEV POSTUPAK, MINIMUM, PRAVAC $v = [1 \; 0]^T$, $\underline{x}_0 = (0, 15)$

$\underline{x}_0 = (0, 15) \qquad x = \qquad x_1 = \lambda_1 \qquad x_2 = 0$

$$F(\lambda) = (\lambda - 15)^2 + 15^2 \qquad \lambda_0 = 0$$

λ	0	1	2	4	8	16	32	64
$F(\lambda)$	450 >	421 >	394 >	346 >	274 >	226 <	514 <	

$\underline{\lambda \in [8, 32]}$

$\varepsilon = 3$

$$c = b - (b - a) \cdot \frac{F_{n-1}}{F_n}$$

$$F_n \geq \frac{b-a}{\varepsilon} = \frac{24}{3} = \underline{8}$$

1, 1, 2, 3, 5, 8, 13, 21

$$d = a + (b - a) \cdot \frac{F_{n-1}}{F_n}$$

a_i	c_i	d_i	b_i
8	<u>17</u>	<u>23</u>	32
8	<u>14</u>	17	23
8	<u>11</u>	14	17
11	14	<u>14</u>	17

STOP

PLOHSJEKICE: 14.01 ZA λ INTERVAL: [14.01, 17]

INTERVAL ZA x_1: [14.01, 17] $\quad x_2 = 0$

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12. ?