Тема 2
Дороблення

N1 (з.doc ст.55 1е)

$$\begin{cases} xy - y^2 = 1 \\ x^2 y + y = 5 \end{cases}$$

$$\begin{cases} x = \varphi_1(x,y) = \dfrac{y^2+1}{y} = y + \dfrac{1}{y} \\ y = \varphi_2(x,y) = \dfrac{5}{x^2+1} \end{cases}$$

$$B = \left(\frac{\partial \varphi_i}{\partial x_j}\right)_{i,j=\overline{1,n}}$$

$$B = \begin{pmatrix} 0 & 1 - \dfrac{1}{y^2} \\ \dfrac{-10x}{(x^2+1)^2} & 0 \end{pmatrix}$$

$$\overline{x}^0 = (2, 2)$$

$$B(\overline{x}^0) = \begin{pmatrix} 0 & \dfrac{3}{4} \\ -\dfrac{4}{5} & 0 \end{pmatrix}$$

$$\|B(\overline{x}^0)\| = \max\left(\frac{4}{5}; \frac{3}{4}\right) = \frac{4}{5} < 1 \Rightarrow$$ в околі поч. набл. метод пр. іт. збігається

КРОК 1

$$x_1 = 2 + \frac{1}{2} = \frac{5}{2}$$

$$y_1 = \frac{5}{5} = 1$$

Крок 2

$$x_2 = 1 + 1 = 2$$

$$y_2 = \frac{5}{\frac{25}{4} + 1} = \frac{20}{29}$$

$M_1 = (-2; ?; -2)$

№4 t4.doc ст. 66 1а)

$$A = \begin{pmatrix} -2 & 1 & 0 \\ 1 & -2 & 1 \\ 0 & 1 & -2 \end{pmatrix}$$

0 крок

$\bar{x}^0 = (2, 1, 1)$

$\bar{e}^0 = \dfrac{\bar{x}^0}{\|\bar{x}^0\|} = \left(\dfrac{2}{\sqrt{6}}; \dfrac{1}{\sqrt{6}}; \dfrac{1}{\sqrt{6}} \right)$

$$\bar{x}^1 = \begin{pmatrix} -2 & 1 & 0 \\ 1 & -2 & 1 \\ 0 & 1 & -2 \end{pmatrix} \begin{pmatrix} \dfrac{2}{\sqrt{6}} \\ \dfrac{1}{\sqrt{6}} \\ \dfrac{1}{\sqrt{6}} \end{pmatrix} = \begin{pmatrix} \dfrac{3}{\sqrt{6}} \\ \dfrac{1}{\sqrt{6}} \\ -\dfrac{1}{\sqrt{6}} \end{pmatrix}$$

$\mu_0 = (-3$

1 крок

$\bar{e}^1 = \dfrac{\bar{x}^1}{\|\bar{x}^1\|} = \dfrac{\bar{x}^1}{\sqrt{\dfrac{9}{6} + \dfrac{1}{6} + \dfrac{1}{6}}} = \dfrac{\sqrt{6}}{\sqrt{11}} \bar{x}^1 = \left(\dfrac{3}{\sqrt{11}}; \dfrac{1}{\sqrt{11}}; -\dfrac{1}{\sqrt{11}} \right)$

$\bar{\mu}_1 = \dfrac{\bar{e}^1}{\bar{e}^0} = \left(-\dfrac{3\sqrt{6}}{2\sqrt{11}}; \dfrac{\sqrt{6}}{\sqrt{11}}; -\dfrac{\sqrt{6}}{\sqrt{11}} \right)$

$$\overline{X}^2 = \begin{pmatrix} -2 & 1 & 0 \\ 1 & -2 & 1 \\ 0 & 1 & -2 \end{pmatrix} \begin{pmatrix} -3 \\ 1 \\ -1 \end{pmatrix} \cdot \frac{1}{\sqrt{11}} = \frac{1}{\sqrt{11}} \begin{pmatrix} 7 \\ -6 \\ 3 \end{pmatrix} = \begin{pmatrix} \frac{7}{\sqrt{11}} \\ \frac{-6}{\sqrt{11}} \\ \frac{3}{\sqrt{11}} \end{pmatrix}$$

2 крок

$$\overline{e}^2 = \frac{\overline{X}^2}{\|\overline{X}^2\|} = \frac{\sqrt{11}}{\sqrt{94}} \overline{x}^2 = \left(\frac{7}{\sqrt{94}} ; -\frac{6}{\sqrt{94}} ; \frac{3}{\sqrt{94}} \right)$$

$$\overline{\mu}_2 = \frac{\overline{e}^2}{e^1} = \left(-\frac{7\sqrt{11}}{3\sqrt{94}} ; -\frac{6\sqrt{11}}{\sqrt{94}} ; -\frac{3\sqrt{11}}{\sqrt{94}} \right)$$

$$\overline{X}^3 = \begin{pmatrix} -2 & 1 & 0 \\ 1 & -2 & 1 \\ 0 & 1 & -2 \end{pmatrix} \begin{pmatrix} 7 \\ -6 \\ 3 \end{pmatrix} \cdot \frac{1}{\sqrt{94}} = \frac{1}{\sqrt{94}} \begin{pmatrix} -20 \\ 22 \\ -12 \end{pmatrix} = \begin{pmatrix} \frac{-20}{\sqrt{94}} \\ \frac{22}{\sqrt{94}} \\ \frac{-12}{\sqrt{94}} \end{pmatrix}$$

3 крок

$$\overline{e}^3 = \frac{\overline{X}^3}{\|\overline{X}^3\|} = \frac{\sqrt{94}}{\sqrt{400+484+144}} \overline{x}^3 = \frac{\sqrt{94}}{2\sqrt{257}} \overline{x}^3 = \left(\frac{-10}{\sqrt{257}} ; \frac{11}{\sqrt{257}} ; \frac{-6}{\sqrt{257}} \right)$$

$$\overline{\mu}_3 = \frac{\overline{e}^3}{e^2} = \left(-\frac{10\sqrt{94}}{7\sqrt{257}} ; -\frac{11\sqrt{94}}{6\sqrt{257}} ; -\frac{6\sqrt{94}}{3\sqrt{257}} \right)$$

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