

Башир 52

N1

$$A \begin{bmatrix} 1 & 5 & -3 \\ 1 & -1 & -1 \\ -2 & 1 & 4 \\ 0 & 2 & -1 \end{bmatrix} \cdot B \begin{bmatrix} 4 & 3 & 5 \\ 6 & 7 & 1 \\ 7 & 1 & -2 \end{bmatrix} =$$

$$= AB \begin{bmatrix} 4+30-21 & 3+35-3 & 5+5+6 \\ 4-6-7 & 3-7-1 & 5-1+2 \\ -8+6+28 & -6+7+4 & -10+1-8 \\ 12-7 & 14-1 & 2+2 \end{bmatrix} = AB \begin{bmatrix} 13 & 35 & 16 \\ -9 & -5 & 6 \\ 26 & 5 & -17 \\ 5 & 13 & 4 \end{bmatrix}$$

N2

$$\begin{cases} 2x_1 - x_2 + 5x_3 = 2 \\ x_1 + 2x_2 + 4x_3 = 0 \\ 3x_1 - 2x_2 + 5x_3 = 1 \end{cases} \quad A \begin{bmatrix} 2 & -1 & 5 \\ 1 & 2 & 4 \\ 3 & -2 & 5 \end{bmatrix} \quad B \begin{bmatrix} 2 \\ 0 \\ 1 \end{bmatrix}$$

1) По формуле Крамера

$$\Delta_1 \begin{vmatrix} 2 & -1 & 5 \\ 1 & 2 & 4 \\ 3 & -2 & 5 \end{vmatrix} = - \begin{vmatrix} -1 & 5 \\ 2 & 5 \end{vmatrix} + 2 \begin{vmatrix} 2 & 5 \\ 3 & 5 \end{vmatrix} - 4 \begin{vmatrix} 2 & -1 \\ 3 & -2 \end{vmatrix} = -5 - 10 + 4 =$$

$$= -11 \neq 0$$

$$\Delta_2 \begin{vmatrix} 2 & -1 & 5 \\ 0 & 2 & 4 \\ 1 & -2 & 5 \end{vmatrix} = 2 \begin{vmatrix} 2 & 5 \\ 1 & 5 \end{vmatrix} - 4 \begin{vmatrix} 2 & -1 \\ 1 & -2 \end{vmatrix} = 10 + 12 = 22$$

$$\Delta_3 \begin{vmatrix} 2 & 2 & 5 \\ 1 & 0 & 4 \\ 3 & 1 & 5 \end{vmatrix} = - \begin{vmatrix} 2 & 5 \\ 1 & 5 \end{vmatrix} - 4 \begin{vmatrix} 2 & 2 \\ 3 & 1 \end{vmatrix} = -5 + 16 = 11$$

2) Метод Сегрени наймри

$$X = A^{-1} \cdot B; \quad \Delta_A = -11 \neq 0$$

$$A_1 = \begin{vmatrix} 2 & 4 \\ 2 & 5 \end{vmatrix} = 18, \quad A_2 = \begin{vmatrix} 1 & 4 \\ 3 & 5 \end{vmatrix} = +7, \quad A_3 = \begin{vmatrix} 1 & 2 \\ 3 & -2 \end{vmatrix} = -8$$

$$A_{11} = \begin{vmatrix} -1 & 5 \\ -2 & 5 \end{vmatrix} = -5, \quad A_{12} = \begin{vmatrix} 2 & 5 \\ 3 & 5 \end{vmatrix} = -5, \quad A_{13} = \begin{vmatrix} 2 & -1 \\ 3 & -2 \end{vmatrix} = +1$$

$$A_{21} = \begin{vmatrix} -1 & 5 \\ 2 & 4 \end{vmatrix} = -19, \quad A_{22} = \begin{vmatrix} 2 & 5 \\ 1 & 4 \end{vmatrix} = -3, \quad A_{23} = \begin{vmatrix} 2 & -1 \\ 1 & 2 \end{vmatrix} = 5$$

$$A^{-1} = -\frac{1}{11} \begin{bmatrix} 18 & 5 & -19 \\ 7 & -5 & -3 \\ -8 & 1 & 5 \end{bmatrix}$$

$$X = A^{-1} \cdot B = -\frac{1}{11} \begin{bmatrix} 18 & 5 & -19 \\ 7 & -5 & -3 \\ -8 & 1 & 5 \end{bmatrix} \cdot \begin{bmatrix} 2 \\ 0 \\ 1 \end{bmatrix} = -\frac{1}{11} \begin{bmatrix} 36 - 19 \\ 14 - 3 \\ -18 + 5 \end{bmatrix} = -\frac{1}{11} \begin{bmatrix} 17 \\ 11 \\ -13 \end{bmatrix} =$$

$$= \begin{bmatrix} -2 \\ -1 \\ 1 \end{bmatrix}$$

$$X = [-2 \quad -1 \quad 1]^T$$



$$\Delta \begin{vmatrix} 2 & -1 & 2 \\ 1 & 2 & 0 \\ 3 & -2 & 1 \end{vmatrix} = - \begin{vmatrix} -1 & 2 \\ -2 & 1 \end{vmatrix} + 2 \begin{vmatrix} 2 & 2 \\ 3 & 1 \end{vmatrix} = -3 - 8 = -11$$

$$x_1 = \frac{\Delta_1}{\Delta} = \frac{22}{-11} = -2$$

$$x_2 = \frac{\Delta_2}{\Delta} = \frac{11}{-11} = -1$$

4 =

$$x_3 = \frac{\Delta_3}{\Delta} = \frac{-11}{-11} = +1$$

$$\begin{cases} -4 + 1 + 5 = 2 \\ -2 - 2 + 4 = 0 \\ -6 + 2 + 5 = 1 \end{cases} \Leftrightarrow \begin{cases} 2 = 2 \\ 0 = 0 \\ 1 = 1 \end{cases}$$

$$X = [-2 \quad -1 \quad 1]^T$$

N3

$$\begin{cases} 3x_1 + x_2 + x_3 + 2x_4 = -1 \\ 3x_1 + 5x_2 + 3x_3 - x_4 = -6 \\ x_1 - 2x_2 + x_3 + 5x_4 = 7 \\ 2x_1 + 5x_2 + 3x_3 - 3x_4 = -7 \end{cases}$$

$= -8$

$= +1$

$= 5$

$$\begin{bmatrix} 3 & 1 & 1 & 2 & -1 \\ 3 & 5 & 3 & -1 & -6 \\ 1 & -2 & 1 & 5 & 7 \\ 2 & 5 & 3 & -3 & -7 \end{bmatrix} \sim \begin{bmatrix} 1 & -2 & 1 & 5 & 7 \\ 3 & 5 & 3 & -1 & -6 \\ 3 & 1 & 1 & 2 & -1 \\ 2 & 5 & 3 & -3 & -7 \end{bmatrix} \sim$$

$$\begin{bmatrix} 1 & -2 & 1 & 5 & 7 \\ 0 & 11 & 0 & -16 & -27 \\ 0 & 7 & -2 & -13 & -22 \\ 0 & 9 & 1 & -13 & -21 \end{bmatrix} \sim \begin{bmatrix} 1 & -2 & 1 & 5 & 7 \\ 0 & 11 & 0 & -16 & -27 \\ 0 & 7 & -2 & -13 & -22 \\ 0 & 2 & 3 & 0 & 1 \end{bmatrix} \sim$$

$$\begin{bmatrix} 1 & -2 & 1 & 5 & 7 \\ 0 & 1 & -15 & -16 & -32 \\ 0 & 7 & -2 & -13 & -22 \\ 0 & 2 & 3 & 0 & 1 \end{bmatrix} \sim \begin{bmatrix} 1 & -2 & 1 & 5 & 7 \\ 0 & 1 & -15 & -16 & -32 \\ 0 & 0 & 101 & 99 & 202 \\ 0 & 0 & 33 & 32 & 65 \end{bmatrix}$$

1	1111	1111	1111	1111	1111	1111	1111	1111	1111
2	1111	1111	1111	1111	1111	1111	1111	1111	1111
3	1111	1111	1111	1111	1111	1111	1111	1111	1111
4	1111	1111	1111	1111	1111	1111	1111	1111	1111

1	1	1	1
2	1	1	1
3	1	1	1
4	1	1	1

$$\begin{bmatrix} 1 & -2 & 1 & 5 & 7 \\ 0 & 1 & -15 & -8 & -32 \\ 0 & 0 & 4 & 3 & 7 \\ 0 & 0 & 23 & 32 & 66 \end{bmatrix} \xrightarrow{R_4 \leftarrow R_4 - 5R_3} \begin{bmatrix} 1 & -2 & 1 & 5 & 7 \\ 0 & 1 & -15 & -8 & -32 \\ 0 & 0 & 4 & 3 & 7 \\ 0 & 0 & 4 & 3 & 7 \end{bmatrix} \xrightarrow{R_4 \leftarrow R_4 - R_3} \begin{bmatrix} 1 & -2 & 1 & 5 & 7 \\ 0 & 1 & -15 & -8 & -32 \\ 0 & 0 & 4 & 3 & 7 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -2 & 1 & 5 & 7 \\ 0 & 1 & -15 & -8 & -32 \\ 0 & 0 & 4 & 3 & 7 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\begin{cases} x_1 - 2x_2 + x_3 + 5x_4 = 7 \\ x_2 - 15x_3 - 8x_4 = -32 \\ x_3 + 4x_4 = 7 \\ 19x_4 = 23 \end{cases} \quad \begin{cases} x_4 = 1 \\ x_3 = 1 \\ x_2 = -1 \\ x_1 = -1 \end{cases}$$

$$X = \begin{bmatrix} 1 & -1 & 1 & 1 \end{bmatrix}^T$$

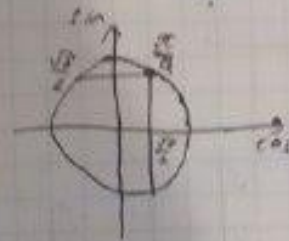


NS

$$7) z = \frac{8}{\sqrt{2} - \sqrt{2}i} = \frac{8(\sqrt{2} + \sqrt{2}i)}{2 - 2i^2} = \frac{8\sqrt{2} + 8\sqrt{2}i}{2 - 2(-1)} = \frac{8\sqrt{2} + 8\sqrt{2}i}{4} = 2\sqrt{2} + 2\sqrt{2}i$$

$$8) z = 2\sqrt{2} + 2\sqrt{2}i \quad (z = x + iy) \quad x = 2\sqrt{2} \quad y = 2\sqrt{2}$$

$$\begin{cases} \rho = \sqrt{x^2 + y^2} = \sqrt{8 + 8} = 4 \\ \cos \varphi = \frac{2\sqrt{2}}{4} = \frac{\sqrt{2}}{2} \\ \sin \varphi = \frac{2\sqrt{2}}{4} = \frac{\sqrt{2}}{2} \end{cases}$$



$$\varphi = \frac{\pi}{4} \in [0; 2\pi)$$

$$z = \rho(\cos \varphi + i \sin \varphi) = \rho e^{i\varphi}$$

$$z = 4(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4}) = 4e^{i\frac{\pi}{4}}$$

$$4) z^5 = \rho^5 e^{i5\varphi} = 4^5 e^{i5\frac{\pi}{4}} = 1024 e^{i\frac{5\pi}{4}}$$

$$5) \sqrt{2}$$

$$\omega_0 = \sqrt[5]{4} e^{i \frac{\frac{5\pi}{4} + 2\pi \cdot 0}{5}} = 2 e^{i \frac{\pi}{4}}$$

$$\omega_1 = \sqrt[5]{4} e^{i \frac{\frac{5\pi}{4} + 2\pi \cdot 1}{5}} = \sqrt[5]{4} e^{i \frac{3\pi}{4}}$$

8281	8464	8649	8836	9025	9216	9409	9604	9801
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N4

$$\begin{vmatrix} 1 & -2 & -1 & 3 \\ 2 & -2 & 0 & -3 \\ 4 & -1 & 3 & 2 \\ -1 & 1 & -2 & -1 \end{vmatrix} = \begin{vmatrix} 1 & 0 & 0 & 0 \\ 2 & -2 & 2 & -9 \\ 4 & 7 & 7 & -10 \\ -1 & -1 & -3 & 2 \end{vmatrix} = \begin{vmatrix} 2 & 2 & -9 \\ 7 & 7 & -10 \\ -1 & -3 & 2 \end{vmatrix} =$$

$$= \begin{vmatrix} 2 & -4 & -5 \\ 7 & -14 & 4 \\ -1 & 0 & 0 \end{vmatrix} = - \begin{vmatrix} 4 & -5 \\ -14 & 4 \end{vmatrix} = - (16 - 70) = 54$$