№2.

$x_1 + x_2 - 4x_3 - 2x_4 + 9x_5 = 0$

$-x_1 + 2x^3 + x^4 - 5x^5 = 0$

$x_1 - x_3 - x_4 + 3x_5 = 0$

$$\begin{pmatrix} 1 & 1 & -4 & -2 & 9 \\ -1 & 0 & 2 & 1 & -5 \\ 1 & 0 & -1 & -1 & 3 \\ -1 & -2 & 7 & 3 & -15 \\ -3 & -4 & 15 & 7 & -33 \end{pmatrix} \sim \begin{pmatrix} 1 & 1 & -4 & -2 & 9 \\ 0 & 1 & -2 & -1 & 4 \\ 0 & -1 & 3 & 1 & -6 \\ 0 & -1 & 3 & 1 & -6 \\ 0 & -1 & -2 & -1 & -6 \end{pmatrix} \sim \begin{pmatrix} 1 & 1 & -4 & -2 & 9 \\ 0 & 1 & -2 & -1 & 4 \\ 0 & 0 & -4 & -2 & -2 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

$$\begin{cases} x_1 + x_2 - 4x_3 - 2x_4 + 9x_5 = 0 \\ x_2 - 2x_3 - x_4 + 4x_5 = 0 \\ -4x_3 - 2x_4 - 2x_5 = 0 \end{cases}$$

$x_3 = -\frac{1}{2}$

$x_1 = -10x_5 - 3x_4 + 3x_3 + 2x_4$

$x_2 = 2x_3 + x_4 + 8x_3 + 4x_4 = 10x_5 + 5x_4$

$x_5 = -2x_3 - x_4$

$x_4, x_5 \quad \bar{e}_1\begin{pmatrix} 0 \\ 1 \end{pmatrix} \quad \bar{e}_2\begin{pmatrix} 1 \\ 0 \end{pmatrix}$

$$\begin{cases} x_1 = x_4 - x_5 \\ x_2 = x_4 \\ x_3 = 2x_5 \\ x_4 = x_4 \\ x_5 = x_5 \end{cases}$$

$$f: \begin{pmatrix} 1 \\ 1 \\ 0 \\ 1 \\ 0 \end{pmatrix}; \begin{pmatrix} -1 \\ 0 \\ 2 \\ 0 \\ 1 \end{pmatrix}$$

№8.

$$\begin{pmatrix} 1 & -2 & 1 & 3 & -4 \\ 1 & -1 & 1 & 1 & -1 \\ -1 & 0 & 0 & 1 & -1 \\ 1 & -1 & 0 & 0 & -1 \\ -4 & 3 & -2 & -2 & 3 \end{pmatrix} \sim \begin{pmatrix} 1 & -2 & 1 & 3 & -4 \\ 0 & 1 & 0 & -2 & 3 \\ 0 & -2 & 1 & 4 & -5 \\ 0 & 3 & -2 & -6 & 7 \\ 0 & -5 & 2 & 10 & -9 \end{pmatrix} \sim \begin{pmatrix} 1 & -1 & 1 & 1 & -1 \\ 0 & -1 & 0 & 2 & -3 \\ 0 & -1 & 1 & 2 & -2 \\ 0 & 1 & -2 & -2 & 1 \\ 0 & -1 & 2 & 2 & -1 \end{pmatrix} \sim$$

$$\sim \begin{pmatrix} 1 & -1 & 1 & 1 & -1 \\ 0 & -1 & 0 & 2 & -3 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & -2 & 0 & -2 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix} \sim \begin{pmatrix} 1 & -1 & 1 & 1 & -1 \\ 0 & -1 & 0 & 2 & -3 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

$$\begin{cases} x_1 - x_2 + x_3 - x_4 - x_5 = 0 \\ -x_2 + 2x_4 - 3x_5 = 0 \\ x_3 - x_5 = 0 \end{cases}$$

$$\begin{cases} x_1 = x_4 - 5x_5 \\ x_2 = 2x_4 - 3x_5 \\ x_3 = x_5 \\ x_4 = x_4 \\ x_5 = x_5 \end{cases} \qquad \begin{cases} x_1 = x_4 - 5x_5 \\ x_2 = 2x_4 - 3x_5 \\ x_3 = -x_5 \\ x_4 = x_4 \\ x_5 = x_5 \end{cases}$$

$$\begin{cases} x_1 = x_4 - 3x_5 \\ x_1 = 2x_4 - 3x_5 - x_5 + x_4 - x_5 \\ x_2 = 2x_4 - 3x_5 \\ x_3 = x_5 \end{cases}$$

$$\vec{e}_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$\vec{e}_2 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

$$f: \begin{pmatrix} 1 \\ 2 \\ 0 \\ 1 \\ 0 \end{pmatrix} \cdot \begin{pmatrix} -5 \\ -3 \\ 1 \\ 0 \\ 1 \end{pmatrix}$$

$$f: \begin{pmatrix} 1 \\ 2 \\ 0 \\ 1 \\ 0 \end{pmatrix} \cdot \begin{pmatrix} -5 \\ -3 \\ 1 \\ 0 \\ 1 \end{pmatrix} \begin{pmatrix} -1 \\ -3 \\ -1 \\ 0 \\ 1 \end{pmatrix}$$

$$x_2 - 2x_4 = x_4$$

$$1x_4 - 3x_5 - 2x_5$$

$$2x_4 + 3x_5 + x_5 - x_4 + x_5$$

$$x_2 = 2x_4 - 3x_5$$

$$x_3 = -x_5$$

$$x_1 = 2x_4 - 3x_5 + x_5 - x_4 + x_5 =$$

$$= x_4 - x_5$$

№2

$$\begin{pmatrix} 1 & 1 & -2 & 2 & 1 \\ -1 & -1 & 2 & -2 & -1 \\ 1 & 1 & -2 & 2 & 1 \\ -2 & -2 & 4 & -4 & -2 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix} \sim \begin{pmatrix} 1 & 1 & -2 & 2 & 1 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

$$\begin{cases} x_1 = -x_2 + 2x_3 - 2x_4 - x_5 \\ x_2 = x_2 \\ x_3 = x_3 \\ x_4 = x_4 \\ x_5 = x_5 \end{cases}$$

$$\overline{e_1} = \begin{pmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}; \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{pmatrix}; \begin{pmatrix} 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{pmatrix}; \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \\ 0 \end{pmatrix}; \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 1 \end{pmatrix}$$

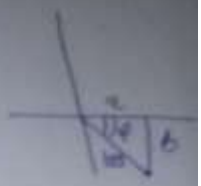
$$\int: \begin{pmatrix} -1 \\ 1 \\ 0 \\ 0 \\ 0 \end{pmatrix}; \begin{pmatrix} 2 \\ 0 \\ 1 \\ 0 \\ 0 \end{pmatrix}; \begin{pmatrix} -2 \\ 0 \\ 0 \\ 1 \\ 0 \end{pmatrix}; \begin{pmatrix} -1 \\ 0 \\ 0 \\ 0 \\ 1 \end{pmatrix}$$

№6.

$$\begin{pmatrix} 1 & -2 & 2 & 2 & 0 \\ 0 & 1 & -2 & -1 & -2 \\ -2 & 4 & -3 & -1 & 1 \\ -1 & 0 & 2 & 1 & 3 \\ 2 & -5 & 5 & 6 & 1 \end{pmatrix} \sim \begin{pmatrix} 1 & -2 & 2 & 2 & 0 \\ 0 & 1 & -2 & -1 & -2 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & -2 & 4 & 3 & 3 \\ 0 & -1 & 1 & 2 & 1 \end{pmatrix} \sim \begin{pmatrix} 1 & -2 & 2 & 2 & 0 \\ 0 & 1 & -2 & -1 & -2 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & -1 & 1 & -1 \end{pmatrix} \sim$$

$$\sim \begin{pmatrix} 1 & -2 & 2 & 2 & 0 \\ 0 & 1 & -2 & -1 & -2 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 1 & 0 \end{pmatrix} \begin{cases} x_1 = 0 \\ x_2 = 0 \\ x_3 = 0 \\ x_4 = 0 \\ x_5 = 0 \end{cases}$$

$\sqrt[3]{\frac{-5+i}{-4-5i}}$ $\quad z=a+bi$



$z=\frac{5+i}{-4-5i}=\frac{(5+i)(-4+5i)}{16+25}=\frac{-29+15i}{41}=-\frac{29}{41}+\frac{15}{41}i$

$tg\varphi=-\frac{29}{15}$ $\quad \sin\varphi=\frac{b}{|z|}=-\frac{29}{\sqrt{1066}}$ $\quad \cos\varphi=\frac{15}{\sqrt{1066}}$

$|z|=\sqrt{225+29^2}/41=\frac{\sqrt{1066}}{41}$

$z_0=\sqrt[3]{\frac{\sqrt{1066}}{41}}\cdot\left(\cos\left(-\frac{1}{3}\operatorname{arctg}\frac{29}{15}\right)+i\sin\left(-\frac{1}{3}\operatorname{arctg}\frac{29}{15}\right)\right)$

$z_0=\frac{\sqrt[6]{1066}}{\sqrt[3]{41}}\cdot\left(\frac{15}{\sqrt{1066}}-\frac{29}{\sqrt{1066}}i\right)$

$z_0=\frac{\sqrt[6]{1066}\cdot 15}{\sqrt[3]{41}\cdot\sqrt{1066}}-\frac{\sqrt[6]{1066}\cdot 29}{\sqrt[3]{41}\cdot\sqrt{1066}}i$

0,43 $\quad$ 0,92

0,87 $\quad$ -0,33

8) $z=-5+3i$

$|z|=\sqrt{25+9}=\sqrt{34}$

$tg\varphi=-\frac{3}{5}$