Вариант № 2 25.03.2002. Семке Даниил

$$\begin{cases} -x_1 + 3x_2 + x_3 + x_4 - 5x_5 = -2 \\ 2x_1 + 2x_2 + 3x_3 + x_4 - 5x_5 = 3 \\ 3x_1 + 2x_2 + 7x_3 + x_4 - 5x_5 = 8 \\ x_1 - 2x_2 + 9x_3 - x_4 + 5x_5 = 12 \end{cases}$$

$$\left(\begin{array}{ccccc|c} -1 & 3 & 1 & 1 & -5 & -2 \\ 2 & 2 & 3 & 1 & -5 & 3 \\ 3 & 2 & 7 & 1 & -5 & 8 \\ 1 & -2 & 9 & -1 & 5 & 12 \end{array}\right) \sim \left(\begin{array}{ccccc|c} -1 & 3 & 1 & 1 & -5 & -2 \\ 0 & 8 & 5 & 3 & -15 & -1 \\ 0 & 11 & 10 & 4 & -20 & 2 \\ 0 & 1 & 10 & 0 & 0 & 10 \end{array}\right) \sim$$

$$\sim \left(\begin{array}{ccccc|c} -1 & 3 & 1 & 1 & -5 & -2 \\ 0 & 1 & 10 & 0 & 0 & 10 \\ 0 & 0 & -75 & 3 & -15 & -81 \\ 0 & 0 & -100 & 4 & -20 & -108 \end{array}\right) \sim \left(\begin{array}{ccccc|c} -1 & 3 & 1 & 1 & -5 & -2 \\ 0 & 1 & 10 & 0 & 0 & 10 \\ 0 & 0 & 100 & -4 & 20 & 108 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{array}\right) \sim$$

$$\sim \left(\begin{array}{ccccc|c} x_1 & x_2 & x_3 & x_4 & x_5 & \\ -1 & 3 & 1 & 1 & -5 & -2 \\ 0 & 1 & 10 & 0 & 0 & 10 \\ 0 & 0 & 25 & -1 & 5 & 27 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{array}\right)$$

$$\begin{cases} x_4 = a \\ x_5 = b \\ x_3 = \dfrac{a + 27 - 5b}{25} \\ x_2 = 10 - \dfrac{2}{5}(a + 27 - 5b) \\ x_1 = 30 - \dfrac{6}{5}(a + 27 - 5b) + \dfrac{a + 27 - 5b}{25} + a - 5b + 2 \end{cases}$$

$$\begin{cases} x_4 = a \\ x_5 = b \\ x_3 = \dfrac{a+27-5b}{25} \\ x_2 = 10 - \frac{2}{5}(a+27-5b) = -\frac{4}{5} - \frac{2}{5}a + 2b \\ x_1 = 30 - \frac{29}{25}(a+27-5b) + a - 5b + 32 = \frac{17}{25} - \frac{4}{25}a + \frac{4}{5}b \end{cases}$$

Частное решение: $a = b = 0$:

$$x_1 = \frac{17}{25}$$

$$x_2 = -\frac{4}{5}$$

$$x_3 = \frac{27}{25}$$

Ответ:
$$x = \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{pmatrix} = \begin{pmatrix} 17/25 \\ -4/5 \\ 27/25 \\ 0 \\ 0 \end{pmatrix} + a \begin{pmatrix} -4/25 \\ -2/5 \\ 1/25 \\ 1 \\ 0 \end{pmatrix} + \begin{pmatrix} 4/5 \\ 2 \\ -1/5 \\ 0 \\ 1 \end{pmatrix} \cdot b$$