$\textcircled{2}|_{6}$ $\underline{1358}$ $(1,1,1,-2)$
$(1,2,3,-3)$

$(a_1,a_2) = 1+2+3+6 = 12$

$x = (x_1, x_2, x_3, x_4)$

$\begin{cases} (x, a_1) = 0 \\ (x, a_2) = 0 \end{cases}$

$\begin{cases} x_1 - 2x_2 + 2x_3 - 3x_4 = 0 \\ 2x_1 - 3x_2 + 2x_3 + 4x_4 = 0 \end{cases}$

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

ФСР

x_1	x_2	x_3	x_4	
1	-2	1	0	$= b_1$
1	1	0	1	$= b_2$

$(b_1, b_2) \neq 0$

$c_1 = b_2$

$c_2 = b_1 - \alpha c_1$ $\quad (c_2, c_1) = 0 \quad , (b_2, c_1) - \alpha(c_1, c_1) = 0$

$$\alpha = \frac{(b_1, c_1)}{(c_1, c_1)} = \frac{1 - 2}{1+4+1} = -\frac{1}{6}$$

$c_2 = b_1 + \frac{1}{6} c_1 = (25, 4, -17, -6)$

1360 $\left(\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{1}{2}\right)$

$\left(\frac{1}{2}, \frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}\right)$

$(a_2, a_1) = \frac{1}{4} + \frac{1}{4} - \frac{1}{4} - \frac{1}{4} = 0$

$(a_2, a_2) = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 1$

$(a_1, a_1) = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 1$

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

$$\sim \begin{pmatrix} 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{pmatrix}$$

$a_3 = \left(\frac{1}{2}, -\frac{1}{2}, \frac{1}{2}, -\frac{1}{2}\right)$

$a_4 = \left(\frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}, \frac{1}{2}\right)$

362 $a_1 = (1, 1, -1, -2)$ $\quad L = \langle a_1, a_2, a_3 \rangle$

$a_2 = (5, 8, -2, -3)$

$a_3 = (3, 9, 3, 8)$

$b_1 = a_1 = (1, 2, 2, -1)$ $\quad \alpha_{21} = \frac{(a_2, b_1)}{(b_1, b_1)} = \frac{5+8+2+6}{1+1+1+4} = 3$

$b_2 = a_2 - \alpha_{21} b_1 =$

$= a_2 - 3b_1 = (2, 5, 1, 3)$

$b_3 = a_3 - \alpha_{31} b_1 - \alpha_{32} b_2$ $\quad \alpha_{31} = \frac{(a_3, b_1)}{(b_1, b_1)} = \frac{3+9-3-16}{7} = -1$

$\alpha_{32} = \frac{(a_3, b_2)}{(b_2, b_2)} = \frac{15+72-6-24}{25+64+4+9} = \frac{57}{102}$

~~363 $a_1 = (2, 1, 3, -1)$~~

~~$a_2 = (7, 4, 3, -3)$~~

~~$a_3 = (1, 1, -6, 0)$~~

~~$(5, 7, 7, 8)$~~

1363 $a_1 = (2,1,3,-1)$

$a_2 = (7,4,3,-3)$

$a_3 = (1,1,-6,0)$

$a_4 = (5,7,7,8)$

$b_1 = a_1$

$b_2 = a_2 - \alpha_{21} b_1 =$ $\qquad \alpha_{21} = \frac{(a_2, b_1)}{(b_1, b_1)} = \frac{14+4+9+3}{4+1+9+1} = \frac{30}{15} = 2$

$= a_2 - 2b_1 = (3,2,-3,-1)$

$b_3 = a_3 - \alpha_{31} b_1 - \alpha_{32} b_2 =$ $\qquad \alpha_{31} = \frac{(a_3, b_1)}{(b_1, b_1)} = \frac{2+1-18}{15} = -1$

$= (1,5,1,10)$ $\qquad \alpha_{32} = \frac{(a_3, b_2)}{(b_2, b_2)} = \frac{7+4-18}{49+16+9+9} =$

$= -\frac{7}{83}$

1371 $x = (5,2,-2,2)$, $a_1 = (2,1,1,-1)$, $a_2 = (1,1,3,0)$, $a_3 = (1,2,8,1)$

$L = \langle a_1, a_2, a_3 \rangle$

$x = y + z \quad y \in L,\ z \in L^{\perp}$

$$(a_1|a_2|a_3) = \begin{pmatrix} 2 & 1 & 1 \\ 1 & 1 & 2 \\ 1 & 3 & 8 \\ -1 & 0 & 1 \end{pmatrix} \sim \begin{pmatrix} 1 & 0 & -1 \\ 2 & 1 & 1 \\ 1 & 1 & 2 \\ 1 & 3 & 8 \end{pmatrix} \sim \begin{pmatrix} 1 & 0 & -1 \\ 0 & 1 & 3 \\ \cancel{0} & \cancel{1} & \cancel{3} \\ \cancel{0} & \cancel{3} & \cancel{9} \end{pmatrix} \Rightarrow$$

$\Rightarrow a_1, a_2$ - б. L

$$\begin{cases} (x, a_1) = (y, a_1) + \underset{0}{(z, a_1)} = (y, a_1) = \lambda_1 (a_1, a_1) + \lambda_2 (a_2, a_1) \\ (x, a_2) = (y, a_2) = \lambda_1 (a_1, a_2) + \lambda_2 (a_2, a_2) \end{cases}$$

$(x, a_1) = \cancel{\dots}\ 10 + 2 - 2 - 2 = 8$ $\qquad (a_1, a_1) = 4+1+1+1 = 7$

$(x, a_2) = 5 + 2 - 6 = 1$ $\qquad (a_2, a_1) = 1+1+9 = 11$

$(a_2, a_1) = 2 + 1 + 3 = 6$

$$\begin{cases} 7\alpha_1 + 6\alpha_2 = 8 \\ 6\alpha_1 + 11\alpha_2 = 1 \end{cases} \quad \begin{cases} \alpha_1 - 5\alpha_2 = 7 \\ 6\alpha_1 + 11\alpha_2 = 1 \end{cases} \quad \begin{cases} \alpha_1 = 7 + 5\alpha_2 \\ (7+5\alpha_2) + 11\alpha_2 = 1 \end{cases} \quad \begin{cases} \alpha_1 = 7 + 5\alpha \\ 16\alpha_2 = -6 \end{cases}$$

$$\begin{cases} \alpha_1 = \frac{71}{8} \\ \alpha_2 = -\frac{3}{8} \end{cases}$$

$y = 2a_1 - a_2 = (3, 1, -1, -2)$

$z = x - y = (2, 1, -1, 4)$

1374 б) $x = (2, 4, -4, 2)$

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

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

x_0 – ч. р. неоднор. сист.

$x_1 = 0$

$x_2 = 0$

$$\begin{cases} x_3 - x_4 = 1 \\ x_3 - 3x_4 = 2 \end{cases}$$

$2x_4 = -1$

$x_4 = -\frac{1}{2}$

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

$x_0 = (0, 0, \frac{1}{2}, \frac{1}{2})$ — ?