ЛАБ 8 ВАР 1

№1 (3.1)

Кол-во вагонов на станции

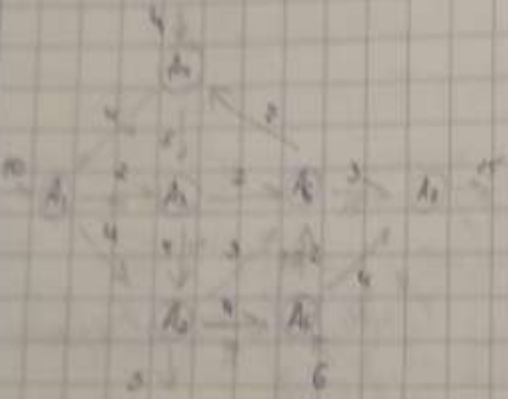
A_1	A_4	A_5
10	4	6

Необходимо на станции

A_2	A_7
5	15

Ст-сть перегона 1 вагона

c_{12}	c_{13}	c_{24}	c_{26}	c_{32}	c_{36}	c_{41}	c_{43}	c_{56}	c_{57}	c_{64}	c_{67}
4	2	4	3	4	2	4	5	2	4	7	3



$z = 4x_{12} + 2x_{13} + 4x_{24} + 3x_{26} + 4x_{32} + 2x_{36} + 4x_{41} + 5x_{43} + 2x_{56} + 4x_{57}$ ...

$$\begin{cases} -x_{14} + x_{13} + x_{12} = 10; \\ -x_{12} - x_{32} + x_{26} + x_{24} = -5; \\ -2x_{13} - 5x_{43} + 2x_{36} + 4x_{32} = 0; \\ -2x_{36} - 2x_{26} + 3x_{67} + 7x_{64} = 0; \\ -7x_{64} + 4x_{41} + 5x_{43} = 4; \\ -4x_{25} + 2x_{56} + 4x_{57} = +6; \\ -4x_{57} - 3x_{67} = -15 \end{cases}$$

$x_{ij} \geq 0$.

$10 - 5 + 0 + 0 + 4 + 6 - 15 = 0$ – модель закрытая.

$\{(4,1), (1,3), (3,2), (2,5), (5,6), (6,7)\}$

$z = 16 + 2? + 2? + ...$

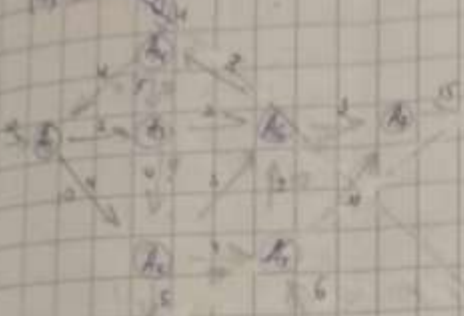
$u_4 - u_1 = 4;$
$u_1 - u_3 = 2;$
$u_3 - u_2 = 4;$
$u_4 - u_5 = 4;$
$u_5 - u_6 = 2;$
$u_6 - u_7 = 3;$

$u_1 = 0;$
$u_2 = -6;$
$u_3 = -2;$
$u_4 = 4;$
$u_5 = -10;$
$u_6 = -12;$
$u_7 = -15;$

$\Delta_{13} = 4 - (0 - 6) \neq 0$
$\Delta_{14} = 2 - (0 - 1) \neq 0$
$\Delta_{26} = 4 - (-6 - 10) \neq 0$
$\Delta_{36} = 3 - (-6 - 12) \neq 0$
$\Delta_{32} = 4 - (-2 - 6) \neq 0$
$\Delta_{36} = 2 - (-2 - 12) \neq 0$

[illegible]

(4, 3) - вводим в базис;
(5, 7) - выводим

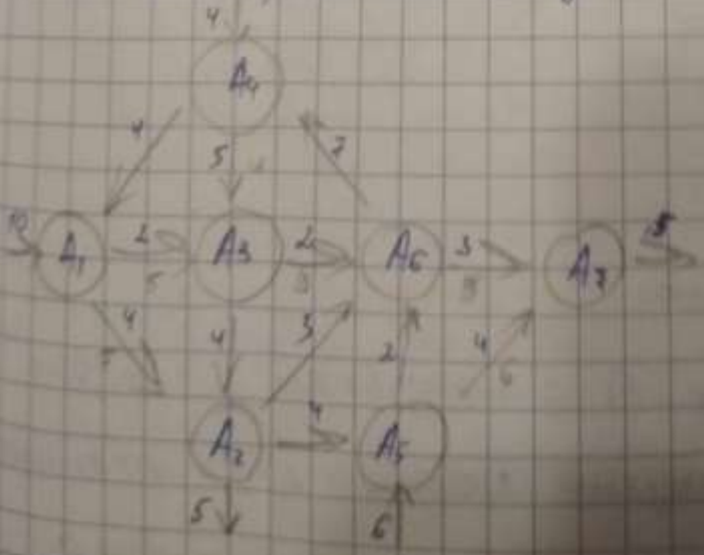


$u_4 - u_3 = 5;$
$u_3 - u_2 = 4;$
$u_1 - u_2 = 4;$
$u_2 - u_6 = 4;$
$u_5 - u_6 = 2;$
$u_6 - u_7 = 3;$

$u_1 = 0;$
$u_2 = -4;$
$u_3 = 0;$
$u_4 = 5;$
$u_5 = -8;$
$u_6 = -10;$
$u_7 = -13;$

[illegible]

Т.к. $\exists\ \Delta_{ij} = 0$, то опт. план не ед.



$Z = 20 + 10 + 20 + 18 + [illegible]$

$u_6 + u_3 = 5$;
$u_1 - u_6 = 2$;
$u_4 - u_2 = 4$;
$u_2 - u_6 = 2$;
$u_6 - u_2 = 3$;
$u_5 - u_6 = 4$;

$u_1 = 1$;
$u_3 = -3$;
$u_6 = 1$;
$u_4 = 6$;
$u_5 = 0$;
$u_6 = -1$;
$u_8 = -4$;

$a_{32} = 4 - (1 + 3) > 0$
$a_{16} = 2 - (1 - 1) = 1$
$a_{35} = 4 - (-3 - 0) > 0$
$a_{36} = 3 - (-3 + 1) > 0$
$a_{32} = 4 - (1 + 3) > 0$
$a_{36} = 2 - (1 + 1) > 0$

$a_{12} = 4 - (6 + 4) > 0$
$a_{13} = 2 - (0 + 2) > 0$
$a_{16} = 4 - 1 - 4 + 3 > 0$
$a_{26} = 3 - 1 - 4 + 4 > 0$
$a_{34} = 4 - 1 - 2 + 4 > 0$
$a_{36} = 2 - 1 - 2 + 4 > 0$

$a_{41} = 4 - (6 - 1) > 0$
$a_{42} = 6 - (6 - 1) > 0$
$a_{45} = 3 - (0 + 1) > 0$
$a_{47} = 4 - (0 + 1) > 0$
$a_{64} = 7 - (1 + 1 - 6) > 0$
$a_{67} = 3 - (-1 + 1 - 4) > 0$

$a_{14} = 4 - (3 - 0) > 0$
$a_{15} = 5 - (3 + 2) > 0$
$a_{35} = 2 - (-3 + 4) > 0$
$a_{37} = 4 - (-3 + 7) > 0$
$a_{64} = 7 - (-1 + 3) > 0$
$a_{67} = 3 - (-1 + 7) > 0$

№3.2.

$z = 4x_{12} + 2x_{13} + 4x_{15} + 3x_{16} + 4x_{32} + 2x_{35} + 4x_{41} + 5x_{43} + 2x_{46} + 4x_{57} + 7x_{64} + 3x_{67} \to \min$;

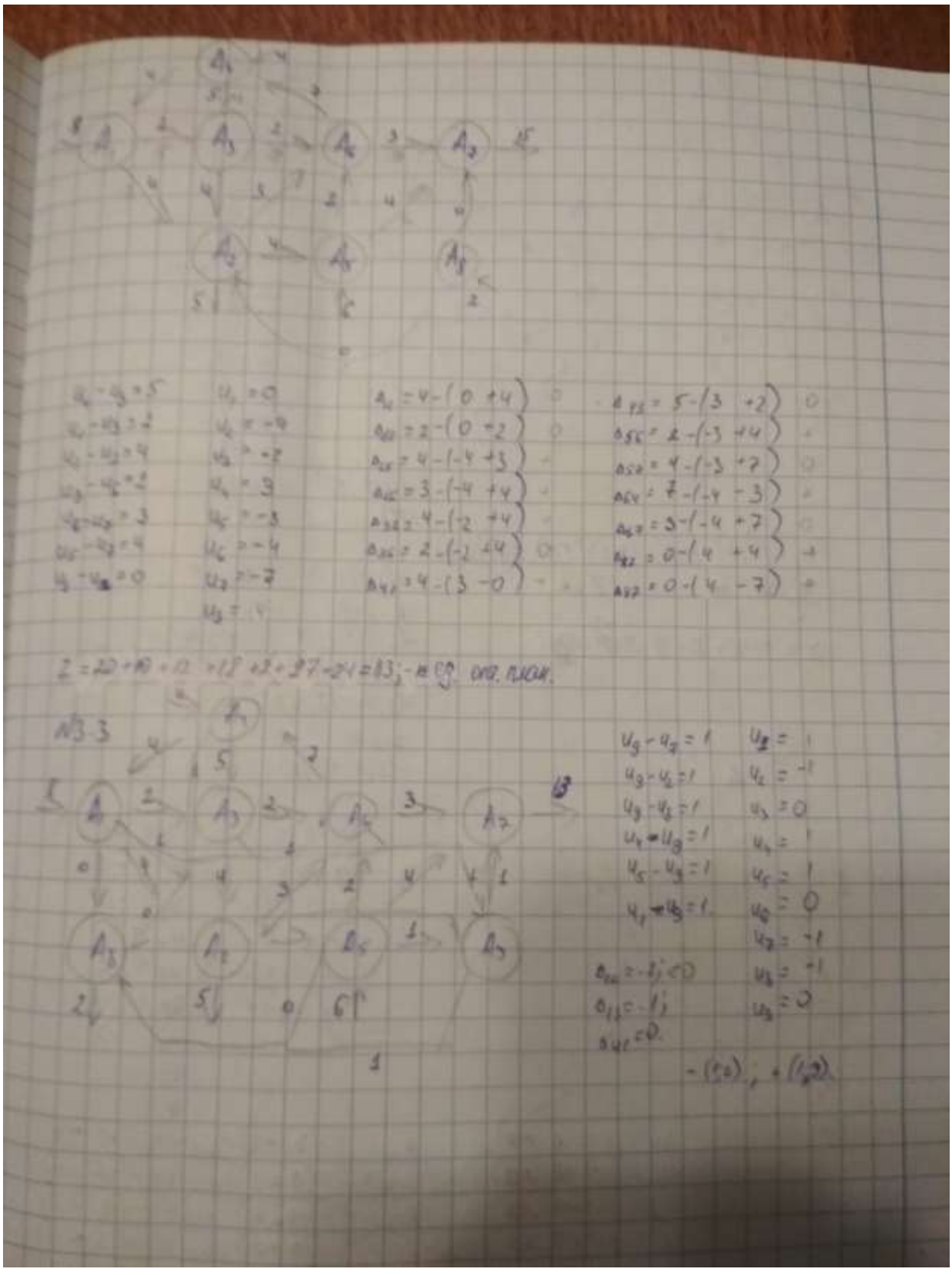
$$\begin{cases} -x_{13} + x_{15} + x_{16} = 8; \\ -x_{12} - x_{13} + x_{35} + x_{36} = -5; \\ -2x_{13} - 5x_{32} + 2x_{36} - 4x_{37} = 0; \\ -2x_{12} - 2x_{35} + 3x_{57} + 7x_{64} = 0; \\ -7x_{12} - 4x_{41} + 5x_{43} = 4; \\ -4x_{15} + 2x_{35} + 4x_{37} = 6; \\ -4x_{57} - 3x_{67} = -15; \\ x_{ij} \geq 0 \end{cases}$$

$8 - 5 + 4 + 6 - 15 = -2$ - открытая

Добавим для истока A_8 с интенсивностью 2 и $C_{12}, C_{13} = \infty$

Построим начальный базисный сетевой поток методом [illegible]

$\{x_{41}, x_{13}, x_{32}, x_{36}, x_{56}, x_{67}\}$ $z = 16 + 11 + 76 + 36 + 30 + 45 + 21 = 235$



$u_1 - u_2 = 5$ $u_1 = 0$ $a_{12} = 4 - (0 + 4) = 0$ $a_{52} = 5 - (3 + 2) = 0$

$u_2 - u_3 = 2$ $u_2 = -4$ $a_{13} = 2 - (0 - 2) = 0$ $a_{56} = 2 - (-3 + 4) = 1$

$u_3 - u_5 = 4$ $u_3 = -7$ $a_{15} = 4 - (-4 + 3) = 1$ $a_{58} = 4 - (-3 + 7) = 0$

$u_5 - u_4 = 2$ $u_4 = 3$ $a_{46} = 3 - (-4 + 4) = 3$ $a_{64} = 7 - (-4 - 3) = 1$

$u_4 - u_6 = 3$ $u_5 = -3$ $a_{34} = 4 - (-2 + 4) = 2$ $a_{67} = 3 - (-4 + 7) = 0$

$u_6 - u_7 = 4$ $u_6 = -4$ $a_{36} = 2 - (-1 + 4) = 0$ $a_{42} = 0 - (4 + 4) = -4$

$u_7 - u_8 = 0$ $u_7 = -7$ $a_{41} = 4 - (3 - 0) = 1$ $a_{87} = 0 - (4 - 7) = 3$

$u_8 = 4$

$Z = 20 + 10 + 0 + 18 + 12 + 27 - 24 = 83$; - не оп. опт. план.

№3.3

$u_3 - u_2 = 1$ $u_1 = 1$

$u_3 - u_6 = 1$ $u_2 = -1$

$u_3 - u_5 = 1$ $u_3 = 0$

$u_4 - u_3 = 1$ $u_4 = 1$

$u_5 - u_3 = 1$ $u_5 = 1$

$u_1 - u_3 = 1$ $u_6 = 0$

$u_7 = +1$

$a_{24} = -1 < 0$ $u_8 = +1$

$a_{11} = -1$; $u_9 = 0$

$a_{41} < 0$.

$-(2,0)$, $+(1,2)$