**Задания для выполнения контрольной работы**

Для выбора варианта контрольной работы необходимо взять предпоследнюю и последнюю цифры номера зачетной книжки. Номер варианта находится на пересечении соответствующей строки и столбца (табл. 4).

Таблица 4 – Варианты контрольных работ

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Последняя цифра номера зачетной книжки | | | | | | | | | | |
|  |  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Предпоследняя цифра номера зачетной книжки | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1 | 11 | 12 | 13 | 14 | 15 | 1 | 2 | 3 | 4 | 5 |
| 2 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 3 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 4 | 11 | 12 | 13 | 14 | 15 | 6 | 7 | 8 | 9 | 10 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 6 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 8 | 16 | 17 | 18 | 19 | 20 | 11 | 12 | 13 | 14 | 15 |
| 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**Задание 1.** Решение основной задачи линейного программирования. Решить основную ЗЛП графическим и симплексEметодом, показать на графике траекторию движения точек решения симплексEметода, проверить полученное решение в Exсel.

**Вариант 1**

F = 7 x1 – 9 x2 –> max, min

x1 + x2≤ 49,

9 x1 – 8 x2 ≥ – 72,

– x2≤ – 2,

x1 + 3 x2 ≥ 9,

x1, x2 ≥ 0.

**Вариант 2**

F = 8 x1 + 9 x2 – > max, min

9 x1 + 3 x2≤ 27,

–3 x1 + 3 x2 ≥ – 9,

7 x1+ 4 x2≤ 28,

2 x1 + x2 ≥ 2,

x1, x2 ≥ 0.

**Вариант 3**

F = – 8 x1 – 5 x2 – > max, min

9 x1 – x2 ≥ – 9,

8 x1 + 4 x2≤ 32,

7 x1 + 9 x2 ≥ 63,

3 x2 ≥ –1,

x1, x2 ≥ 0.

**Вариант 4**

F = 3 x1 + 2 x2 – > max, min

7 x1 – 7 x2 ≥ – 49,

4 x1 + 7 x2 ≥ 28,

8 x1 – x2 ≥ – 8,

10 x1 + 9 x2≤ 90,

x1, x2 ≥ 0.

**Вариант 5**

F = – 4 x1 + x2 – > max, min

x1 – 9 x2≤ – 9,

7 x1 – 6 x2 ≥ 42,

5 x1 + 9 x2 ≥ 45,

– 7 x1 + 2 x2≤ 14,

x1, x2 ≥ 0.

**Вариант 6**

F = – x2 – > max, min

7 x1 + 5 x2 ≥ 35,

– 2 x1 + 3 x2 ≥ 6,

8 x1 + 3 x2 ≥ 24,

– 5 x1 + 2 x2≤ 10,

x1, x2 ≥ 0.

**Вариант 7**

F = 5 x1 + x2 – > max, min

– 2 x1 + 3 x2 ≥ – 6,

– 8 x1 + 8 x2≤ 64,

– 4 x1 + 8 x2 ≥ – 32,

7 x1 + 9 x2 ≥ 63,

x1, x2 ≥ 0.

**Вариант 8**

F = 4 x1 – > max, min

4 x1 + 8 x2 ≥ 32,

12 x1 + 7 x2≤ 84,

x1 – 9 x2≤ – 9,

– 3 x1 + 5 x2≤ 15,

x1, x2 ≥ 0.

**Вариант 9**

F = 5 x1 + 6 x2 – > max, min

4 x1 – 3 x2≤ 24,

2 x1 – x2≤ 2,

6 x1 – 9 x2 ≥ – 54,

– 2 x1 ≥ – 9,

x1, x2 ≥ 0.

**Вариант 10**

F = – x1 + 8 x2 – > max, min

x1 + x2 ≥ 3,

x1 – 2 x2≤ 2,

4 x1 + 7 x2 ≥ 28,

–9 x1 + 2 x2≤ 18,

x1, x2 ≥ 0.

**Вариант 11**

F = – 7 x1 + x2 – > max, min

5 x1 – 7 x2 ≥ – 35,

2 x1 + x2≤ 4,

x1 + 3 x2 ≥ 3,

– 2 x2 ≥ – 5,

x1, x2 ≥ 0.

**Вариант 12**

F = 2 x1 – x2 – > max, min

3 x1 + x2 ≥ 6,

5 x1 + 6 x2≤ 30,

x1 – x2 ≥ – 1,

– x1 + x2≤ 4,

x1, x2 ≥ 0

**Вариант 13**

F = – 4 x1 – 5 x2 – > max, min

x1 + x2≤ 8,

x1 – x2 ≥ 4,

x1 + 6 x2 ≥ 6,

x1 + x2≤ 9,

x1, x2 ≥ 0.

**Вариант 14**

F = – 5 x1 + 7 x2 – > max, min

– 5 x1 + 3 x2 ≥ 15,

x1 + 4 x2 ≥ 8,

5 x1 + 6 x2≤ 30,

9 x1 – 2 x2≤ 18,

x1, x2 ≥ 0.

**Вариант 15**

F = – 9 x1 + x2 – > max, min

– 2 x1 + x2 ≥ – 4,

8 x1 + x2 ≥ 8,

x1 – 5 x2≤ – 5,

2 x1 – x2≤ 2,

x1, x2 ≥ 0.

**Вариант 16**

F = 7 x1 – 9 x2 –> max, min

x1 + x2≤ 49,

9 x1 – 8 x2 ≥ – 72,

– x2≤ – 2,

x1 + 3 x2 ≥ 9,

x1, x2 ≥ 0.

**Вариант 17**

F = 8 x1 + 9 x2 – > max, min

9 x1 + 3 x2≤ 27,

–3 x1 + 3 x2 ≥ – 9,

7 x1+ 4 x2≤ 28,

2 x1 + x2 ≥ 2,

x1, x2 ≥ 0.

**Вариант 18**

F = – 8 x1 – 5 x2 – > max, min

9 x1 – x2 ≥ – 9,

8 x1 + 4 x2≤ 32,

7 x1 + 9 x2 ≥ 63,

3 x2 ≥ –1,

x1, x2 ≥ 0.

**Вариант 19**

F = 3 x1 + 2 x2 – > max, min

7 x1 – 7 x2 ≥ – 49,

4 x1 + 7 x2 ≥ 28,

8 x1 – x2 ≥ – 8,

10 x1 + 9 x2≤ 90,

x1, x2 ≥ 0.

**Вариант 20**

F = – 4 x1 + x2 – > max, min

x1 – 9 x2≤ – 9,

7 x1 – 6 x2 ≥ 42,

5 x1 + 9 x2 ≥ 45,

– 7 x1 + 2 x2≤ 14,

x1, x2 ≥ 0.

**Задание 2** Найти опорное решение транспортной задачи методом северо западного угла и минимального элемента. Найти оптимальное решение транспортной задачи распределительным методом, методом потенциалов, проверить полученное решение в EXEL.

|  |  |
| --- | --- |
| **1) *a1* =*24, a2* = *42, b1* =*18, b2* =*12, b3* =*36,***  ***z11= 6, z12= 3, z13= 1, z21= 5, z22= 2, z23= 4*** | **11) *a1* =*24, a2* = *42, b1* =*18, b2* =*12, b3* =*36,***  ***z11= 6, z12= 3, z13= 1, z21= 5, z22= 2, z23= 4*** |
| **2) *a1* =*24, a2* = *42,*  *b1* =*18, b2* =*12, b3* =*36,***  ***z11= 12, z12= 6, z13= 2, z21= 10, z22= 4, z23= 8*** | **12) *a1* =*24, a2* = *42,*  *b1* =*18, b2* =*12, b3* =*36,***  ***z11= 12, z12= 6, z13= 2, z21= 10, z22= 4, z23= 8*** |
| **3) *a1* =*24, a2* = *42, b1* =*18, b2* =*12, b3* =*36,***  ***z11= 18, z12= 9, z13= 3, z21= 15, z22= 6, z23= 12*** | **13) *a1* =*24, a2* = *42, b1* =*18, b2* =*12, b3* =*36,***  ***z11= 18, z12= 9, z13= 3, z21= 15, z22= 6, z23= 12*** |
| **4) *a1* =*24, a2* = *42, b1* =*18, b2* =*12, b3* =*36,***  ***z11= 24, z12= 12, z13= 4, z21= 20, z22= 8, z23= 16*** | **14) *a1* =*24, a2* = *42, b1* =*18, b2* =*12, b3* =*36,***  ***z11= 24, z12= 12, z13= 4, z21= 20, z22= 8, z23= 16*** |
| **5) *a1* =*32, a2* = *56,*  *b1* =*24, b2* =*16, b3* =*48,***  ***z11= 6, z12= 3, z13= 1, z21= 5, z22= 2, z23= 4*** | **15) *a1* =*32, a2* = *56,*  *b1* =*24, b2* =*16, b3* =*48,***  ***z11= 6, z12= 3, z13= 1, z21= 5, z22= 2, z23= 4*** |
| **6) *a1* =*32, a2* = *56,*  *b1* =*24, b2* =*16, b3* =*48,***  ***z11= 12, z12= 6, z13= 2, z21= 10, z22= 4, z23= 8*** | **16) *a1* =*32, a2* = *56,*  *b1* =*24, b2* =*16, b3* =*48,***  ***z11= 12, z12= 6, z13= 2, z21= 10, z22= 4, z23= 8*** |
| **7) *a1* =*32, a2* = *56,*  *b1* =*24, b2* =*16, b3* =*48,***  ***z11= 18, z12= 9, z13= 3, z21= 15, z22= 6, z23= 12*** | **17) *a1* =*32, a2* = *56,*  *b1* =*24, b2* =*16, b3* =*48,***  ***z11= 18, z12= 9, z13= 3, z21= 15, z22= 6, z23= 12*** |
| **8) *a1* =*32, a2* = *56, b1* =*24, b2* =*16, b3* =*48,***  ***z11= 24, z12= 12, z13= 4, z21= 20, z22= 8, z23= 16*** | **18) *a1* =*32, a2* = *56, b1* =*24, b2* =*16, b3* =*48,***  ***z11= 24, z12= 12, z13= 4, z21= 20, z22= 8, z23= 16*** |
| **9) *a1* = *8, a2* = *14, b1* =*6, b2* =*4, b3* =*12,***  ***z11= 6, z12= 3, z13= 1, z21= 5, z22= 2, z23= 4*** | **19) *a1* = *8, a2* = *14, b1* =*6, b2* =*4, b3* =*12,***  ***z11= 6, z12= 3, z13= 1, z21= 5, z22= 2, z23= 4*** |
| **10)  *a1* = *8, a2* = *14,*  *b1* =*6, b2* =*4, b3* =*12,***  ***z11= 12, z12= 6, z13= 2, z21= 10, z22= 4, z23= 8*** | **20)  *a1* = *8, a2* = *14,*  *b1* =*6, b2* =*4, b3* =*12,***  ***z11= 12, z12= 6, z13= 2, z21= 10, z22= 4, z23= 8*** |