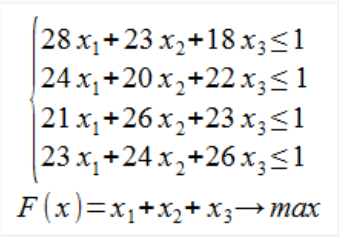
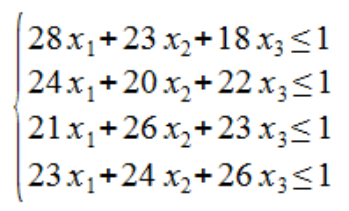
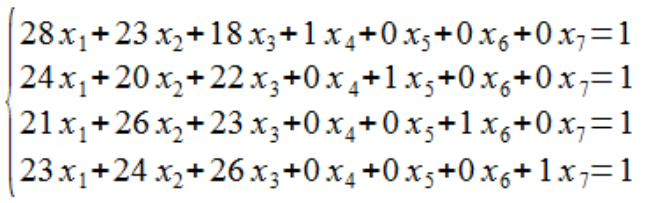
Лабораторная работа №9.

Магазин может завезти в различных пропорциях товары четырех типов (А1, А2, А3, A4); их реализация и прибыль магазина зависят от вида товара и состояния спроса. Предполагается, что спрос может иметь три состояния (В1,В2, В3) и не прогнозируется. Определить оптимальные пропорции в закупке товаров из условия максимизации средней гарантированной прибыли при следующей матрице прибыли.

|  | | B | | |  |
| --- | --- | --- | --- | --- | --- |
| B1 | B2 | B3 |
| A | A1 | 28 | 23 | 18 | 18 |
| A2 | 24 | 20 | 22 | 20 |
| A3 | 21 | 26 | 23 | 21 |
| A4 | 23 | 24 | 26 | 23 |
|  | | 28 | 26 | 26 |  |

Определим верхнюю и нижнюю цены игры: седловая точка отсутствует и оптимальное решение следует искать в смешанных стратегиях игроков.

|  | B | x1 | x2 | x3 | x4 | x5 | x6 | x7 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x4 | 1 | 28 | 23 | 18 | 1 | 0 | 0 | 0 |
| x5 | 1 | 24 | 20 | 22 | 0 | 1 | 0 | 0 |
| x6 | 1 | 21 | 26 | 23 | 0 | 0 | 1 | 0 |
| x7 | 1 | 23 | 24 | 26 | 0 | 0 | 0 | 1 |
| F() | 0 | -1 | -1 | -1 | 0 | 0 | 0 | 0 |

| Базис | B | x1 | x2 | x3 | x4 | x5 | x6 | x7 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x4 | 1 | 28 | 23 | 18 | 1 | 0 | 0 | 0 |
| x5 | 1 | 24 | 20 | 22 | 0 | 1 | 0 | 0 |
| x6 | 1 | 21 | 26 | 23 | 0 | 0 | 1 | 0 |
| x7 | 1 | 23 | 24 | 26 | 0 | 0 | 0 | 1 |
| F(X1) | 0 | -1 | -1 | -1 | 0 | 0 | 0 | 0 |

| Базис | B | x1 | x2 | x3 | x4 | x5 | x6 | x7 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x4 | 4/13 | 12(1/13) | 6(5/13) | 0 | 1 | 0 | 0 | -9/13 |
| x5 | 2/13 | 4(7/13) | -4/13 | 0 | 0 | 1 | 0 | -11/13 |
| x6 | 3/26 | 17/26 | 4(10/13) | 0 | 0 | 0 | 1 | -23/26 |
| x3 | 1/26 | 23/26 | 12/13 | 1 | 0 | 0 | 0 | 1/26 |
| F(X2) | 1/26 | -3/26 | -1/13 | 0 | 0 | 0 | 0 | 1/26 |

| Базис | B | x1 | x2 | x3 | x4 | x5 | x6 | x7 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x1 | 4/157 | 1 | 83/157 | 0 | 13/157 | 0 | 0 | -9/157 |
| x5 | 6/157 | 0 | -2(111/157) | 0 | -59/157 | 1 | 0 | -92/157 |
| x6 | 31/314 | 0 | 4(133/314) | 0 | -17/314 | 0 | 1 | -133/157 |
| x3 | 5/314 | 0 | 143/314 | 1 | -23/314 | 0 | 0 | 14/157 |
| F(X3) | 13/314 | 0 | -5/314 | 0 | 3/314 | 0 | 0 | 5/157 |

| Базис | B | x1 | x2 | x3 | x4 | x5 | x6 | x7 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x1 | 19/1389 | 1 | 0 | 0 | 124/1389 | 0 | -166/1389 | 61/1389 |
| x5 | 137/1389 | 0 | 0 | 0 | -568/1389 | 1 | 850/1389 | -1534/1389 |
| x2 | 31/1389 | 0 | 1 | 0 | -17/1389 | 0 | 314/1389 | -266/1389 |
| x3 | 8/1389 | 0 | 0 | 1 | -94/1389 | 0 | -143/1389 | 245/1389 |
| F(X4) | 58/1389 | 0 | 0 | 0 | 13/1389 | 0 | 5/1389 | 40/1389 |

Оптимальный план можно записать так:

x1 = 19/1389

x2 = 31/1389

x3 = 8/1389

F(X) = 1\*19/1389 + 1\*31/1389 + 1\*8/1389 = 58/1389

y1 = 13/1389

y2 = 0

y3 = 5/1389

y4 = 40/1389

Z(Y) = 1\*13/1389+1\*0+1\*5/1389+1\*40/1389 = 58/1389

Цена игры будет равна g = 1/F(x)

qi = g\*yi; pi = g\*xi.

Цена игры: g = 1/(58/1389) = 23(55/58)

p1 = 23(55/58) \* 13/1389 = 13/58

p2 = 23(55/58) \* 0 = 0

p3 = 23(55/58) \* 5/1389= 5/58

p4 = 23(55/58) \* 40/1389 = 20/29

Оптимальная смешанная стратегия игрока I: (13/58; 0; 5/58; 20/29)