**Решение СЛАУ методом Гаусса**.  
Запишем систему в виде расширенной матрицы:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 2 | -7 | 5 | | 1 | 5 | -5 | | 4 | -2 | 7 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 9 | | -2 | | 24 | |  | |  |

Для удобства вычислений поменяем строки местами:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 4 | -2 | 7 | | 2 | -7 | 5 | | 1 | 5 | -5 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 24 | | 9 | | -2 | |  | |  |

Работаем со столбцом №1  
Умножим 2-ю строку на (k = -1 / 2 = -1/2) и добавим к 3-й:

|  |  |  |  |
| --- | --- | --- | --- |
| 4 | -2 | 7 | 24 |
| 2 | -7 | 5 | 9 |
| 0 | 17/2 | -15/2 | -13/2 |

Умножим 1-ю строку на (k = -2 / 4 = -1/2) и добавим к 2-й:

|  |  |  |  |
| --- | --- | --- | --- |
| 4 | -2 | 7 | 24 |
| 0 | -6 | 3/2 | -3 |
| 0 | 17/2 | -15/2 | -13/2 |

Работаем со столбцом №2  
Умножим 2-ю строку на (k = 17/2 / 6 = 17/12) и добавим к 3-й:

|  |  |  |  |
| --- | --- | --- | --- |
| 4 | -2 | 7 | 24 |
| 0 | -6 | 3/2 | -3 |
| 0 | 0 | -43/8 | -43/4 |

Получим единицы на главной диагонали. Для этого всю строку делим на соответствующий элемент главной диагонали:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 1 | -1/2 | 7/4 | | 0 | 1 | -1/4 | | 0 | 0 | 1 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 6 | | 1/2 | | 2 | |  | |  |

Теперь исходную систему можно записать как:  
x = 6 - ( - 1/2y + 7/4z)  
y = 1/2 - ( - 1/4z)  
z= 2  
Из 3-ой строки выражаем z:  
z = 2.  
Из 2-ой строки выражаем y:  
y = 1/2 - (-1/4)\*2 = 1.  
Из 1-ой строки выражаем x:  
x = 6 - (-1/2)\*1 - 7/4\*2 = 3.

**Ответ: x= 3, y = 1, z = 2.**