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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
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|  |  |  |
| --- | --- | --- |
| 2 | -7 | 5 |
| 1 | 5 | -5 |
| 4 | -2 | 7 |

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| --- | --- | --- | --- | --- |
|

|  |
| --- |
| 9 |
| -2 |
| 24 |

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Для удобства вычислений поменяем строки местами:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| --- | --- | --- |
| 4 | -2 | 7 |
| 2 | -7 | 5 |
| 1 | 5 | -5 |

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| --- | --- | --- | --- | --- |
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|  |
| --- |
| 24 |
| 9 |
| -2 |

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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:

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

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|

|  |
| --- |
| 6 |
| 1/2 |
| 2 |

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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.**