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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 1 | 2 | 1 | | -1 | 3 | -2 | | -1 | -7 | 4 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 5 | | 3 | | -5 | |  | |  |

Добавим 2-ю строку к 1-й:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 0 | 5 | -1 | | -1 | 3 | -2 | | -1 | -7 | 4 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 8 | | 3 | | -5 | |  | |  |

Умножим 3-ю строку на (-1). Добавим 3-ю строку к 2-й:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 0 | 5 | -1 | | 0 | 10 | -6 | | -1 | -7 | 4 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 8 | | 8 | | -5 | |  | |  |

Умножим 1-ю строку на (2). Умножим 2-ю строку на (-1). Добавим 2-ю строку к 1-й:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 0 | 0 | 4 | | 0 | 10 | -6 | | -1 | -7 | 4 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 8 | | 8 | | -5 | |  | |  |

Теперь исходную систему можно записать так:  
x3 = 8/4  
x2 = [8 - ( - 6x3)]/10  
x1 = [-5 - ( - 7x2 + 4x3)]/(-1)  
Из 1-й строки выражаем x3  
https://chart.googleapis.com/chart?cht=tx&chl=x_%7b3%7d%20=%20\frac%7b8%7d%7b4%7d%20=%202  
Из 2-й строки выражаем x2  
https://chart.googleapis.com/chart?cht=tx&chl=x_%7b2%7d%20=%20\frac%7b8%20-%20(-6)\cdot%202%7d%7b10%7d%20=%20\frac%7b20%7d%7b10%7d%20=%202  
Из 3-й строки выражаем x1  
https://chart.googleapis.com/chart?cht=tx&chl=x_%7b1%7d%20=%20\frac%7b-5%20-%20(-7)\cdot%202%20-%204\cdot%202%7d%7b-1%7d%20=%20\frac%7b1%7d%7b-1%7d%20=%20-1.

2) Запишем систему в виде расширенной матрицы:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 1 | 2 | -1 | | 2 | -1 | 1 | | 3 | 4 | -5 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 2 | | 3 | | -4 | |  | |  |

Умножим 1-ю строку на (2). Умножим 2-ю строку на (-1). Добавим 2-ю строку к 1-й:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 0 | 5 | -3 | | 2 | -1 | 1 | | 3 | 4 | -5 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 1 | | 3 | | -4 | |  | |  |

Умножим 2-ю строку на (3). Умножим 3-ю строку на (-2). Добавим 3-ю строку к 2-й:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 0 | 5 | -3 | | 0 | -11 | 13 | | 3 | 4 | -5 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 1 | | 17 | | -4 | |  | |  |

Умножим 1-ю строку на (11). Умножим 2-ю строку на (5). Добавим 2-ю строку к 1-й:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 0 | 0 | 32 | | 0 | -11 | 13 | | 3 | 4 | -5 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 96 | | 17 | | -4 | |  | |  |

Теперь исходную систему можно записать так:  
x3 = 96/32  
x2 = [17 - (13x3)]/(-11)  
x1 = [-4 - (4x2 - 5x3)]/3  
Из 1-й строки выражаем x3  
https://chart.googleapis.com/chart?cht=tx&chl=x_%7b3%7d%20=%20\frac%7b96%7d%7b32%7d%20=%203  
Из 2-й строки выражаем x2  
https://chart.googleapis.com/chart?cht=tx&chl=x_%7b2%7d%20=%20\frac%7b17%20-%2013\cdot%203%7d%7b-11%7d%20=%20\frac%7b-22%7d%7b-11%7d%20=%202  
Из 3-й строки выражаем x1  
https://chart.googleapis.com/chart?cht=tx&chl=x_%7b1%7d%20=%20\frac%7b-4%20-%204\cdot%202%20-%20(-5)\cdot%203%7d%7b3%7d%20=%20\frac%7b3%7d%7b3%7d%20=%201.

3) Запишем систему в виде расширенной матрицы:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 1 | 1 | -2 | | 0 | 1 | -3 | | 0 | -3 | 11 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 6 | | 4 | | -14 | |  | |  |

Для удобства вычислений поменяем строки местами:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 0 | 1 | -3 | | 0 | -3 | 11 | | 1 | 1 | -2 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 4 | | -14 | | 6 | |  | |  |

Умножим 1-ю строку на (3). Добавим 2-ю строку к 1-й:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 0 | 0 | 2 | | 0 | -3 | 11 | | 1 | 1 | -2 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | -2 | | -14 | | 6 | |  | |  |

Теперь исходную систему можно записать так:  
x3 = -2/2  
x2 = [-14 - (11x3)]/(-3)  
x1 = [6 - (x2 - 2x3)]/1.  
Из 1-й строки выражаем x3  
https://chart.googleapis.com/chart?cht=tx&chl=x_%7b3%7d%20=%20\frac%7b-2%7d%7b2%7d%20=%20-1  
Из 2-й строки выражаем x2  
https://chart.googleapis.com/chart?cht=tx&chl=x_%7b2%7d%20=%20\frac%7b-14%20-%2011\cdot%20(-1)%7d%7b-3%7d%20=%20\frac%7b-3%7d%7b-3%7d%20=%201  
Из 3-й строки выражаем x1  
https://chart.googleapis.com/chart?cht=tx&chl=x_%7b1%7d%20=%20\frac%7b6%20-%201\cdot%201%20-%20(-2)\cdot%20(-1)%7d%7b1%7d%20=%20\frac%7b3%7d%7b1%7d%20=%203