Запишем систему в виде расширенной матрицы:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 2 | 1 | -1 | | 3 | 3 | -2 | | 1 | 1 | 1 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 5 | | 8 | | 6 | |  | |  |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 0 | -3 | 1 | | 3 | 3 | -2 | | 1 | 1 | 1 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | -1 | | 8 | | 6 | |  | |  |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 0 | -3 | 1 | | 0 | 0 | -5 | | 1 | 1 | 1 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | -1 | | -10 | | 6 | |  | |  |

Для удобства вычислений поменяем строки местами:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | 0 | 0 | -5 | | 0 | -3 | 1 | | 1 | 1 | 1 | |  | |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | -10 | | -1 | | 6 | |  | |  |

Теперь исходную систему можно записать так:  
x3 = -10/(-5)  
x2 = [-1 - (x3)]/(-3)  
x1 = [6 - (x2 + x3)]/1  
Из 1-й строки выражаем x3  
https://chart.googleapis.com/chart?cht=tx&chl=x_%7b3%7d%20=%20\frac%7b-10%7d%7b-5%7d%20=%202  
Из 2-й строки выражаем x2  
https://chart.googleapis.com/chart?cht=tx&chl=x_%7b2%7d%20=%20\frac%7b-1%20-%201\cdot%202%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-%201\cdot%202%7d%7b1%7d%20=%20\frac%7b3%7d%7b1%7d%20=%203

***Решение:***

2x1 + x2 - x3 = 5

3x1 + 3x2 - 2x3 = 8

x1 + x2 + x3 = 6

Перепишем систему уравнений в матричном виде и решим его методом Гаусса

2 1 -1 5

3 3 -2 8

1 1 1 6

1-ую строку делим на 2

1 0.5 -0.5 2.5

3 3 -2 8

1 1 1 6

от 2 строки отнимаем 1 строку, умноженную на 3; от 3 строки отнимаем 1 строку, умноженную на 1

1 0.5 -0.5 2.5

0 1.5 -0.5 0.5

0 0.5 1.5 3.5

2-ую строку делим на 1.5

1 0.5 -0.5 2.5

0 1 -1/3 1/3

0 0.5 1.5 3.5

от 1 строки отнимаем 2 строку, умноженную на 0.5; от 3 строки отнимаем 2 строку, умноженную на 0.5

1 0 -1/3 7/3

0 1 -1/3 1/3

0 0 5/3 10/3

3-ую строку делим на 5/3

1 0 -1/3 7/3

0 1 -1/3 1/3

0 0 1 2

к 1 строке добавляем 3 строку, умноженную на 13; к 2 строке добавляем 3 строку, умноженную на 13

1 0 0 3

0 1 0 1

0 0 1 2

x1 = 3

x2 = 1

x3 = 2

Сделаем проверку. Подставим полученное решение в уравнения из системы и выполним вычисления:

2·3 + 1 - 2 = 6 + 1 - 2 = 5  
3·3 + 3·1 - 2·2 = 9 + 3 - 4 = 8  
3 + 1 + 2 = 3 + 1 + 2 = 6

Проверка выполнена успешно.

**Ответ:**

x1 = 3

x2 = 1

x3 = 2