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

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

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| --- |
| 5 |
| 3 |
| -5 |

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Добавим 2-ю строку к 1-й:

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

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| 8 |
| 3 |
| -5 |

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

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

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| 8 |
| 8 |
| -5 |

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

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

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| --- | --- | --- | --- | --- |
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| --- |
| 8 |
| 8 |
| -5 |

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Теперь исходную систему можно записать так:
x3 = 8/4
x2 = [8 - ( - 6x3)]/10
x1 = [-5 - ( - 7x2 + 4x3)]/(-1)
Из 1-й строки выражаем x3

Из 2-й строки выражаем x2

Из 3-й строки выражаем x1
.

2) Запишем систему в виде расширенной матрицы:

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

 |  |

 |  |

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

|  |
| --- |
| 2 |
| 3 |
| -4 |

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

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

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

 |  |

 |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
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|  |
| --- |
| 1 |
| 3 |
| -4 |

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

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

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

|  |
| --- |
| 1 |
| 17 |
| -4 |

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

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

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| --- |
| 96 |
| 17 |
| -4 |

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Теперь исходную систему можно записать так:
x3 = 96/32
x2 = [17 - (13x3)]/(-11)
x1 = [-4 - (4x2 - 5x3)]/3
Из 1-й строки выражаем x3

Из 2-й строки выражаем x2

Из 3-й строки выражаем x1
.

3) Запишем систему в виде расширенной матрицы:

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

|  |  |  |
| --- | --- | --- |
| 1 | 1 | -2 |
| 0 | 1 | -3 |
| 0 | -3 | 11 |

 |  |

 |  |

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

|  |
| --- |
| 6 |
| 4 |
| -14 |

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Для удобства вычислений поменяем строки местами:

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

|  |  |  |
| --- | --- | --- |
| 0 | 1 | -3 |
| 0 | -3 | 11 |
| 1 | 1 | -2 |

 |  |

 |  |

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

|  |
| --- |
| 4 |
| -14 |
| 6 |

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

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

|  |  |  |
| --- | --- | --- |
| 0 | 0 | 2 |
| 0 | -3 | 11 |
| 1 | 1 | -2 |

 |  |

 |  |

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

|  |
| --- |
| -2 |
| -14 |
| 6 |

 |  |

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Теперь исходную систему можно записать так:
x3 = -2/2
x2 = [-14 - (11x3)]/(-3)
x1 = [6 - (x2 - 2x3)]/1.
Из 1-й строки выражаем x3

Из 2-й строки выражаем x2

Из 3-й строки выражаем x1
