Решение системы линейных уравнений второго порядка методом Крамера

Решим систему линейных уравнений, используя метод Крамера.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Знак системы |  | 3 | x1 | - |  | x2 | = | -14 |
|  |  | x1 | + |  | x2 | = | 2 |

Запишем формулы Крамера:

x1 = det A1 / det A

x2 = det A2 / det A

На ноль делить нельзя. Поэтому если det A равен нулю, то использовать формулы Крамера невозможно.

Вычислим det A.

det A состоит из коэффициентов левой части системы уравнений.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Знак системы |  | 3 | x1 | - |  | x2 | = | -14 |
|  |  | x1 | + |  | x2 | = | 2 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| det A = |  | 3 | -1 |  |  |
| 1 | 1 |

= 3 \* 1 - ( -1) \* 1 = 3 + 1 = 4

det A не равен нулю. Использование формул Крамера возможно.

Вычислим det A1

Необходимо заменить столбец 1 в det A на столбец свободных членов системы.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Система |  | det A |  | det A1 |
| |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Знак системы |  | 3 | x1 | - |  | x2 | = | -14 | |  |  | x1 | + |  | x2 | = | 2 | |  | |  |  |  |  | | --- | --- | --- | --- | |  | 3 | -1 |  | | 1 | 1 | |  | |  |  |  |  | | --- | --- | --- | --- | |  | -14 | -1 |  | | 2 | 1 | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| det A1 = |  | -14 | -1 |  |  |
| 2 | 1 |

= -14 \* 1 - ( -1) \* 2 = -14 + 2 = -12

Вычислим det A2

Необходимо заменить столбец 2 в det A на столбец свободных членов системы.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Система |  | det A |  | det A2 |
| |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Знак системы |  | 3 | x1 | - |  | x2 | = | -14 | |  |  | x1 | + |  | x2 | = | 2 | |  | |  |  |  |  | | --- | --- | --- | --- | |  | 3 | -1 |  | | 1 | 1 | |  | |  |  |  |  | | --- | --- | --- | --- | |  | 3 | -14 |  | | 1 | 2 | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| det A2 = |  | 3 | -14 |  |  |
| 1 | 2 |

= 3 \* 2 - ( -14) \* 1 = 6 + 14 = 20

Ответ:

x1 = det A1 / det A = -12/4 = -3

x2 = det A2 / det A = 20/4 = 5