

In []: Computational Mathematic Lab 2. Gauss method
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In [38]: def gauss_elimination(A, b):
n = len(b)
for i in range(n):
    max_row = i
    for k in range(i + 1, n):
        if abs(A[k][i]) > abs(A[max_row][i]):
            max_row = k

    A[i], A[max_row] = A[max_row], A[i]
    b[i], b[max_row] = b[max_row], b[i]

    # Приведение к ступенчатому виду
    for k in range(i + 1, n):
        factor = A[k][i] / A[i][i]
        b[k] -= factor * b[i]
        for j in range(i, n):
            A[k][j] -= factor * A[i][j]

x = [0] * n
for i in range(n - 1, -1, -1):
    x[i] = b[i] / A[i][i]
    for k in range(i - 1, -1, -1):
        b[k] -= A[k][i] * x[i]
return x
```

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In [39]: # 2)Output of the program. (25%)
A = [
    [0, 1, -1],
    [-3, 0, 2],
    [-2, 1, 2]
]
b = [8, -11, -3]

solution = gauss_elimination(A, b)
print("Решение:", solution)
```

Решение: [2.1999999999999997, 5.8, -2.2]

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In [ ]: Исходная система уравнений
[0, 1, -1] 8
[-3, 0, 2] -11
[-2, 1, 2] -3
Перестановка строк
[-3, 0, 2] -11
[0, 1, -1] 8.0
[0, 1, 2/3] 13/3
Приведение к ступенчатому виду
[-3, 0, 2] -11
[0, 1, -1] 8.0
[0, 0, 5/3] -11/3
Начало обратного хода
[-3, 0, 2] -6.6
[0, 1, -1] 5.8
[0, 0, 5/3] -11/3

x3 = (-11/3) / (5/3) = -11 / 5 = -2.2
x2 = 8 - (-1) * (-2.2) = 5.8
x1 = (-11 - 2 * (-2.2)) / (-3) = (-11 + 4.4) / (-3) = -6.6 / -3 = 2.2
```