Both **Gaussian Elimination** and **Gauss-Jordan Elimination** involve performing a series of row operations, and the number of operations depends on the size (order) of the matrix.

**Number of Operations:**

1. **Gaussian Elimination**:
   * For an n×nn \times nn×n matrix, Gaussian elimination typically requires about **23n3\frac{2}{3} n^332​n3** operations for the forward elimination step.
   * The back substitution step requires about **n2n^2n2** operations.
   * Total operations for Gaussian elimination: roughly **23n3+n2\frac{2}{3}n^3 + n^232​n3+n2**.
2. **Gauss-Jordan Elimination**:
   * Gauss-Jordan elimination eliminates both above and below the pivots, and it continues until the matrix is in reduced row echelon form. This makes it more computationally expensive than Gaussian elimination.
   * The number of operations is approximately **n3n^3n3**.

**Plotting the Number of Operations:**

Let’s create a graph showing the number of operations as a function of the matrix order nnn for both Gaussian Elimination and Gauss-Jordan Elimination.

The graph above illustrates the **number of operations** required for **Gaussian Elimination** and **Gauss-Jordan Elimination** as a function of matrix order.

* **Gaussian Elimination** (blue line) grows with an approximate complexity of 23n3+n2\frac{2}{3}n^3 + n^232​n3+n2, which is less computationally expensive than Gauss-Jordan for larger matrix orders.
* **Gauss-Jordan Elimination** (green line) grows with n3n^3n3, making it more costly in terms of operations, especially as the matrix size increases.

As the matrix order increases, the difference in computational cost between the two methods becomes more pronounced.

Both \*\*Gaussian Elimination\*\* and \*\*Gauss-Jordan Elimination\*\* involve performing a series of row operations, and the number of operations depends on the size (order) of the matrix.

### \*\*Number of Operations:\*\*

1. \*\*Gaussian Elimination\*\*:

- For an \( n \times n \) matrix, Gaussian elimination typically requires about \*\*\( \frac{2}{3} n^3 \)\*\* operations for the forward elimination step.

- The back substitution step requires about \*\*\( n^2 \)\*\* operations.

- Total operations for Gaussian elimination: roughly \*\*\( \frac{2}{3}n^3 + n^2 \)\*\*.

2. \*\*Gauss-Jordan Elimination\*\*:

- Gauss-Jordan elimination eliminates both above and below the pivots, and it continues until the matrix is in reduced row echelon form. This makes it more computationally expensive than Gaussian elimination.

- The number of operations is approximately \*\*\( n^3 \)\*\*.

### Plotting the Number of Operations:

Let’s create a graph showing the number of operations as a function of the matrix order \( n \) for both Gaussian Elimination and Gauss-Jordan Elimination.

The graph above illustrates the \*\*number of operations\*\* required for \*\*Gaussian Elimination\*\* and \*\*Gauss-Jordan Elimination\*\* as a function of matrix order.

- \*\*Gaussian Elimination\*\* (blue line) grows with an approximate complexity of \( \frac{2}{3}n^3 + n^2 \), which is less computationally expensive than Gauss-Jordan for larger matrix orders.

- \*\*Gauss-Jordan Elimination\*\* (green line) grows with \( n^3 \), making it more costly in terms of operations, especially as the matrix size increases.

As the matrix order increases, the difference in computational cost between the two methods becomes more pronounced.