

Gauss Elimination Method

This presentation explores the Gauss elimination method, a fundamental algorithm in linear algebra for solving systems of linear equations. The method involves transforming the system into an upper triangular form, which simplifies the solving process.

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Overview of the Problem

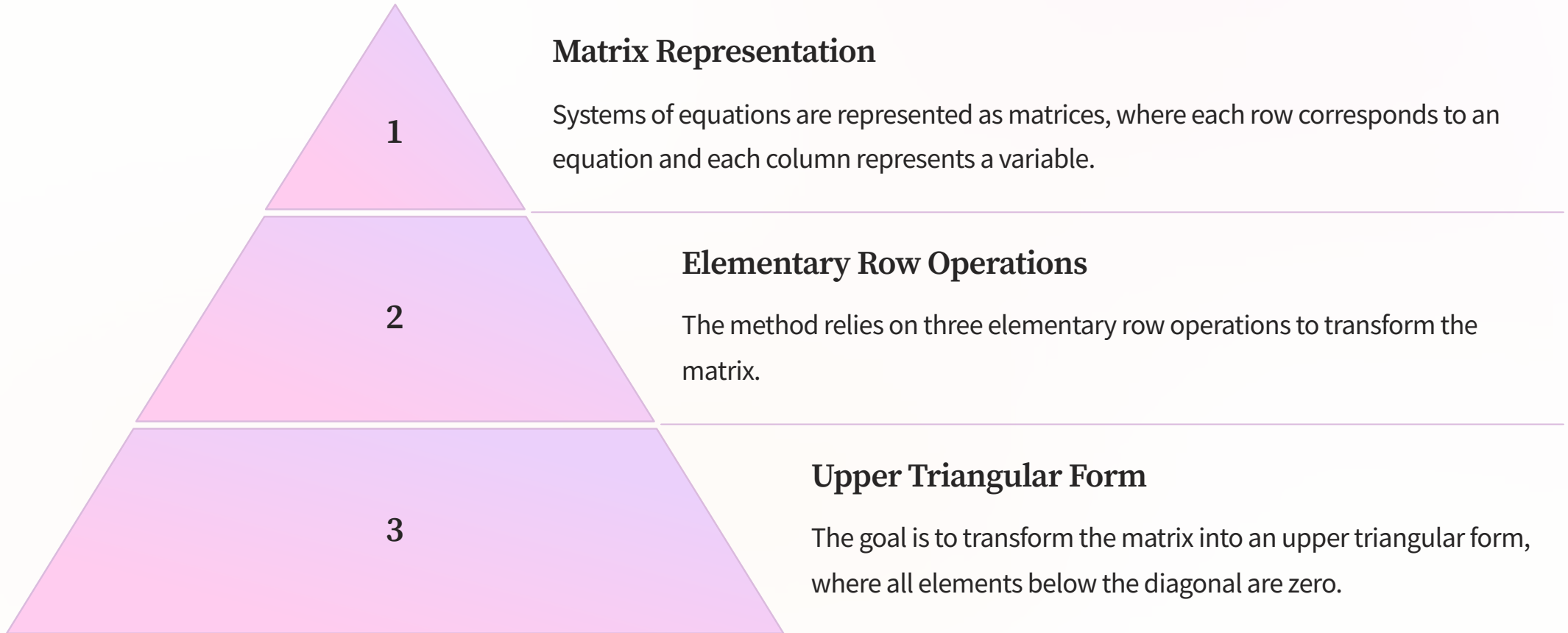
Systems of Equations

The Gauss elimination method is a powerful technique for solving systems of linear equations, which involve multiple equations with multiple unknowns.

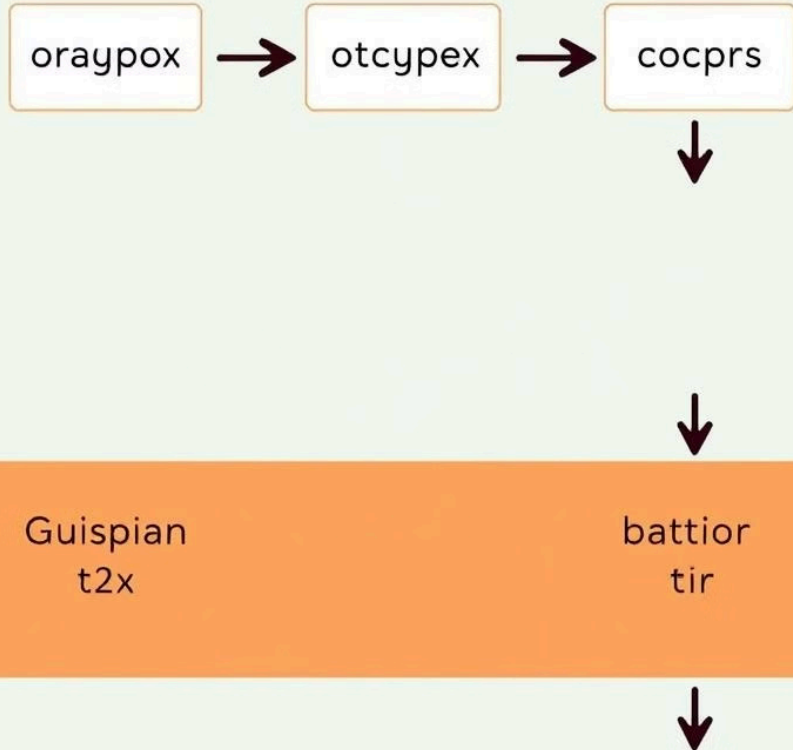
Applications

Solving systems of equations is essential in various fields, including engineering, physics, economics, and computer science.

Mathematical Background



GAUSTIAN ELIMINATION



The Gauss Elimination Algorithm

- 1 Forward Elimination: Transforming the system into an upper triangular form.
- 2 Back Substitution: Solving for the unknowns by substituting values from the last equation to the first.

Step-by-Step Example

1

Step 1

Transform the augmented matrix into row echelon form by applying row operations.

2

Step 2

Back substitute to find the solution of the linear system of equations.



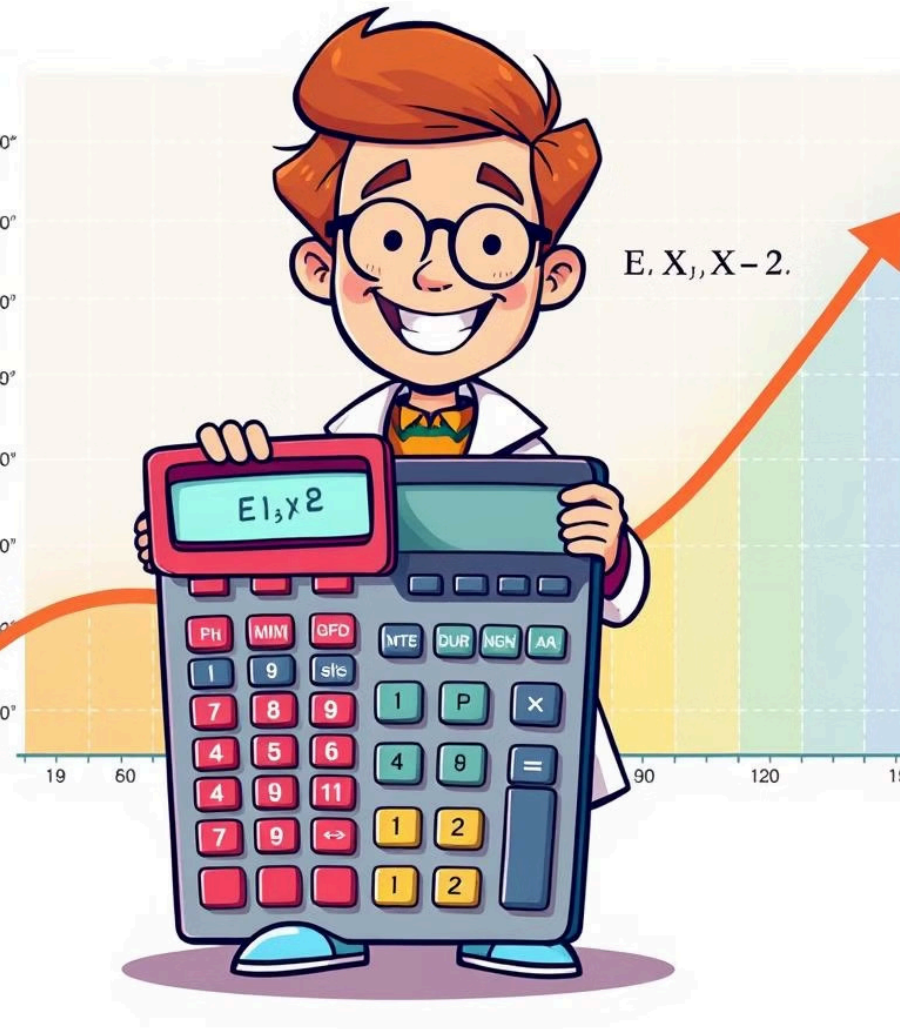
Advantages and Limitations

Advantages

It is a straightforward and widely used method for solving linear systems.

Limitations

It can be computationally intensive for large systems and prone to round-off errors.



Computational Complexity

$$O(n^3)$$

Time Complexity

The time complexity of Gauss elimination is cubic in the number of equations.

27	22	14	18	24	24	23	25	.9
23	24	13	25	26	21	22	28	5
20	26	28	25	25	27	23	22	.9
22	22	22	22	24	25	22	24	24

Conclusion and Key Takeaways

Gauss elimination is a fundamental method for solving systems of linear equations. While computationally efficient for small systems, it can be challenged by large systems and round-off errors. Understanding its advantages and limitations is crucial for choosing the right solution method.