# Introduction

The objective of this document is to offer insight into some numerical algorithms of Gauss Elimination Method and investigate their perfomance. For a demonstration we will use only 4 x 4 coefficient matrixes A, namely systems of four linear equations in the four unknowns.
Some words about using this document :

click **button** to execute an operation;

type input into input - fields

read output from output - fields

All algorithms are from book
"Computing linear algebra" by Semoushin I.V. and Kulikov G.U.
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# Algorithm 1. $L\bar{U}$ - expansion on a method of Gauss

Initial matrix : A =

select the main element

Reset | Random | Test | Run

$L\bar{U}$ - expansion :

Eliminate x1
Eliminate x2
Eliminate x3

Inverse matrix :

Invert

Solving of System of Linear Equations Ax = b :

Solve

b =

x =

# Algorithm 2. $\overline{LU}$ - expansion on a method of Gauss

Initial matrix : A =

select the main element

Reset | Random | Test

$\overline{LU}$ - expansion :

Run

Eliminate x1

Eliminate x2

Eliminate x3

Inverse matrix :

Invert

Solving of System of Linear Equations Ax = b :

Solve

b =

x =

# Algorithm 3. $L\overline{U}$ - expansion on a method of Gauss(by rows)

Initial matrix : A =

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☐ select the main element

**Reset** **Random** **Test**

$L\overline{U}$ - expansion : **Run**

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**Eliminate x1**
**Eliminate x2**
**Eliminate x3**

Inverse matrix : **Invert**

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

Solving of System of Linear Equations Ax = b : **Solve**

b =

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x =

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# Algorithm 4. $L\overline{U}$ - expansion under compact scheme of Kraut

Initial matrix : A =

select the main element

Reset | Random | Test

$L\overline{U}$ - expansion :

Run

Step 1 | Step 2 | Step 3 | Step 4

Inverse matrix :

Invert

Solving of System of Linear Equations Ax = b :

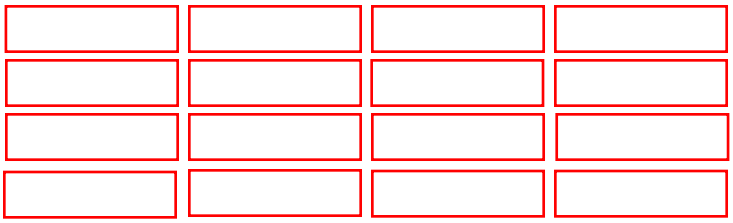
Solve

b =

x =

# Algorithm 5. $\overline{LU}$ - expansion under compact scheme of Kraut

Initial matrix : A =

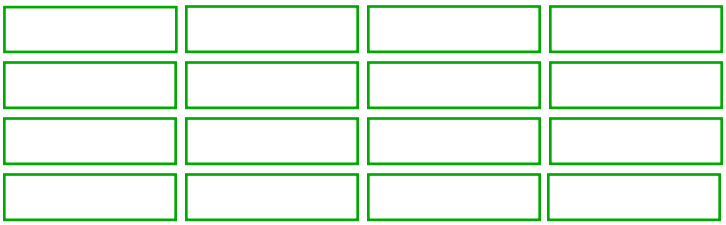


☐ select the main element

**Reset** **Random** **Test**

$\overline{LU}$ - expansion :

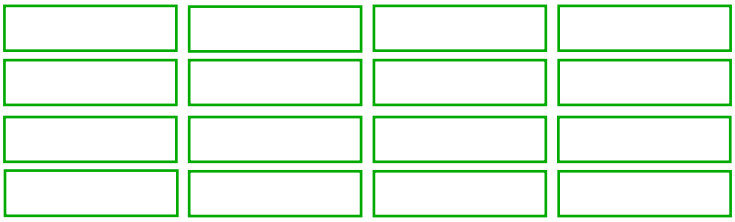
**Run**



**Step 1**
**Step 2**
**Step 3**
**Step 4**

Inverse matrix :

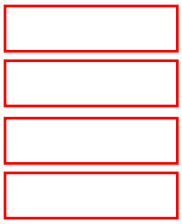
**Invert**



Solving of System of Linear Equations Ax = b :

**Solve**

b =



x =

# Algorithm 6. $L\bar{U}$ - expansion under compact scheme "row by row"

Initial matrix : A =

select the main element

Reset | Random | Test

$L\bar{U}$ - expansion :

Run

Step 1 | Step 2 | Step 3 | Step 4

Inverse matrix :

Invert

Solving of System of Linear Equations Ax = b :

Solve

b =

x =

# Algorithm 7. $\overline{LU}^{-1}$ - expansion on a method of Jordan

Initial matrix : A =

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| | | | |

☐ select the main element

**Reset** **Random** **Test**

$\overline{LU}^{-1}$ - expansion :

**Run**

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**Eliminate x1**
**Eliminate x2**
**Eliminate x3**
**Change sign**

Inverse matrix :

**Invert**

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Solving of System of Linear Equations Ax = b :

**Solve**

b =

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x =

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