

# CALCMATR

Calculations with matrices of integers or fractions of up to 4 rows x 5 columns

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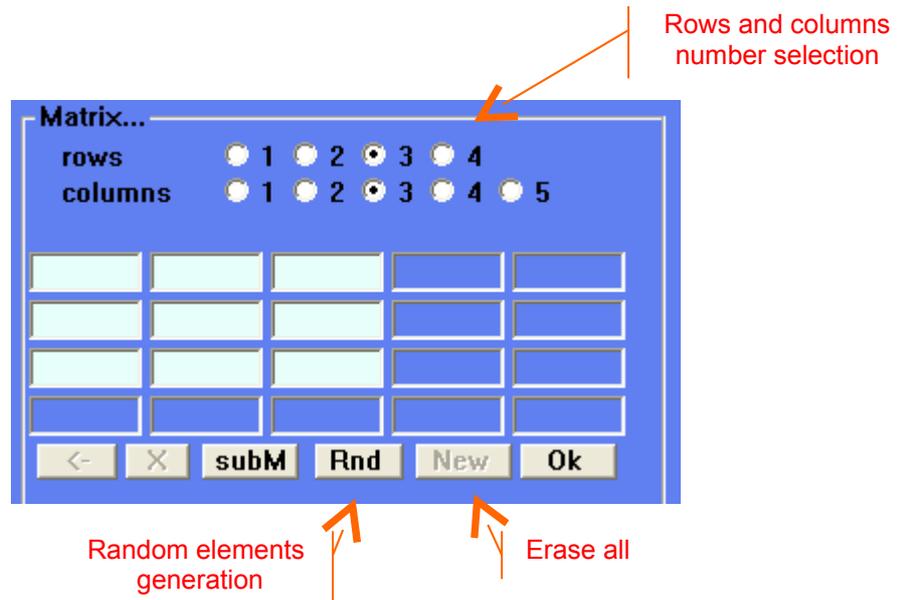
## The main window

Collection of generated matrices

[Matrix intro. /edition](#)

The screenshot displays the 'Calculations with matrices' software window. The main area shows a collection of matrices labeled J, K, L, M, N, O, and P. Matrix J is  $\begin{bmatrix} 2 & 1 & 5 \\ 4 & 0 & 0 \\ 2 & -3 & -5 \\ 1 & 5 & -2 \end{bmatrix}$ , K is  $\begin{bmatrix} 3 & 2 \\ 4 & 0 \end{bmatrix}$ , L is  $\begin{bmatrix} 0 & 0 & -1 & -1 & 0 \\ 3 & 1 & 1 & 3 & 1 \\ -4 & 3 & 0 & 3 & 1 \end{bmatrix}$ , M is  $\begin{bmatrix} 2 & 0 & -5 & -5 & 3 \\ 5 & -1 & 0 & 3 & 2 \\ -4 & 2 & -4 & 5 & -2 \\ 1 & 1 & 0 & 0 & -3 \end{bmatrix}$ , N is  $\begin{bmatrix} -4 & -2 \\ 4 & -2 \\ 5 & 5 \\ 4 & 2 \end{bmatrix}$ , O is  $\begin{bmatrix} 4 & 4 \\ -5 & -5 \\ 0 & 5 \\ 5 & 5 \end{bmatrix}$ , and P is  $\begin{bmatrix} 1 & -1 \\ -4 & 2 \end{bmatrix}$ . The right panel shows 'Matrix = J\*L' with row and column selection options. A grid of numbers is displayed, and various operation buttons like 'determiner', 'inverse', and 'System >' are visible. The bottom of the window has 'Reset', 'Generate...', and a dropdown menu showing '7'.

## Introducing/editing matrices



You can:

- Introduce the elements manually
- Generate random elements
- Incorporate a matrix from the collection

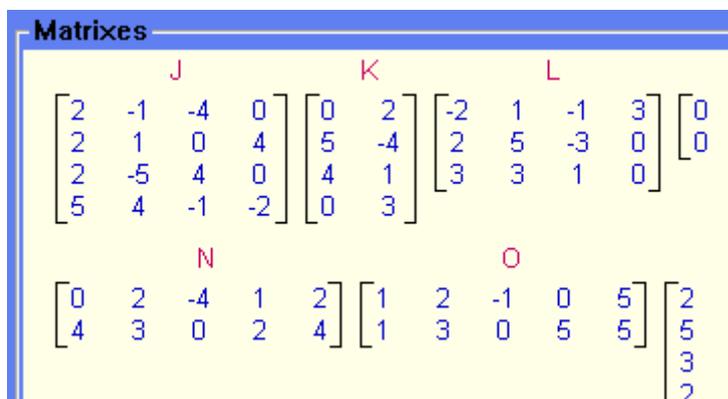
## Generation of N aleatory matrices

To practice operations, properties, etc.

Selecting their number of the list and pressing the button **Generate...**



Erase the collection



## Operations with one matrix (introduced or selected)

According to the matrix type they will be activated the buttons for the possible operations with it.

*The result will appear on the same edition zone (therefore, if the original interests and it is not in the collection it is necessary to incorporate it previously)*

The screenshot shows a 'Matrix...' dialog box with the following elements:

- rows:** Radio buttons for 1, 2, 3 (selected), 4.
- columns:** Radio buttons for 1, 2, 3 (selected), 4, 5.
- Matrix values:** A 3x5 grid with values:
 

7	1	1		
1	-3	7		
-1	0	-3		
- Buttons:** <- (labeled 'Incorporate to the collection'), ×, subM, Rnd, New, Ok.
- range:** Input field with value 3.
- determiner:** Input field with value 56 (labeled 'Matrix parameters').
- Operations:** trasp., adjuncts, inverse, triangular (Gauss), diagonal (Gauss-Jordan) (labeled 'Make system of equations'), System >.
- Other:** M · (labeled 'Multiplication by an integer or fraction'), M ^ (labeled 'Power M^n').

## Operations between matrices

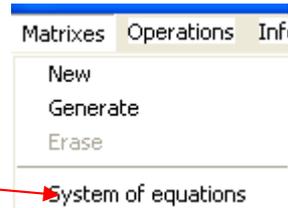
The screenshot shows an 'Operation matrixes' dialog box with a dropdown menu containing the expression  $K^*M+P^2$  and an Ok button.

Introducing a chain of operations (addition, subtraction, product, raising to power) among matrices of the collection, the result will appear in the edition panel

Naturally, the chain of operations should respect their compatibilities among the operands: equal dimensions for the addition, columns of A = rows of B in  $A*B$ , etc...

# Systems of equations

Option of the menu **matrices**



It's possible also make a system from the current matrix with the option Make system of the menu **Operations**

It allows introducing, editing and solving systems of up to 4 equations and 4 unknowns

System coefficients introduction/editing panel  
Only integers and fractions are allowed. Equations and unknowns number are established by means the scrollbars

System showing

**System**

$$\begin{matrix} 5x + y + z = 2 \\ -3x - 2y - 2z = -3 \\ 5x + y + 3z = -2 \end{matrix}$$

**System edition**

Inc	x	y	z	t	=
5	1	1			2
-3	-2	-2			-3
5	1	3			-2

**enlarged matrix A'**

$$\begin{bmatrix} 5 & 1 & 1 & 2 \\ -3 & -2 & -2 & -3 \\ 5 & 1 & 3 & -2 \end{bmatrix} \rightarrow \begin{bmatrix} 5 & 1 & 1 & 2 \\ 0 & -7 & -7 & -9 \\ 0 & 0 & 1 & -2 \end{bmatrix}$$

A range = 3

**coefficients matrix A**

$$\begin{bmatrix} 5 & 1 & 1 \\ -3 & -2 & -2 \\ 5 & 1 & 3 \end{bmatrix} \rightarrow \begin{bmatrix} 5 & 1 & 1 \\ 0 & -1 & -1 \\ 0 & 0 & 1 \end{bmatrix}$$

A range = 3

**Conclusion**

A range = A' => compatible system  
range = 3 = n unknowns => DETERMINATED (D.C.S.)

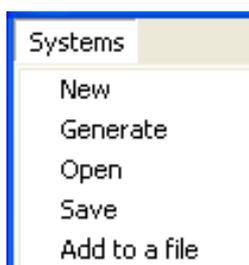
Solution: x=1/7 y=23/7 z=-2

comment: 3x3 SCD

Exit

List of incorporated systems

## Menu



- Erases the edition panel for a new system
- Generates a system with aleatory coefficients
- Opens a systems relationship (file .sts)
- Saves the current systems list in a new file
- Add the current systems list to an existent file