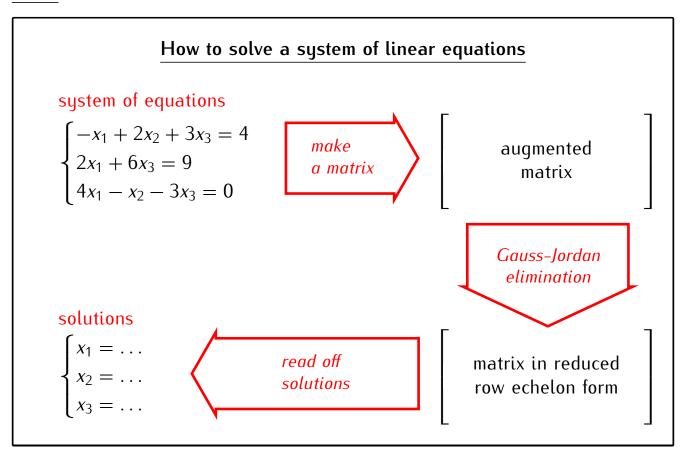
#### Next:



### **Matrices**

matrix = rectangular array of numbers

Example.

$$\left[\begin{array}{ccc} 1 & 2 & 3 \\ 4 & 5 & 6 \end{array}\right]$$

$$\begin{bmatrix}
1 & 2 & 0 \\
7 & -5 & 1 \\
8 & 10 & 7 \\
6 & 4 & 3
\end{bmatrix}$$

#### Note

Every system of linear equations can be represented by a matrix.

Example.

$$\begin{cases}
-x_1 + 2x_2 + 3x_3 = 4 \\
2x_1 + 6x_3 = 9 \\
4x_1 - x_2 - 3x_3 = 0
\end{cases}$$

## Elementary row operations:

1) Interchange of two rows.

Example.

$$\left[\begin{array}{cccc}
1 & 2 & 3 & 4 \\
0 & 1 & 5 & 1 \\
4 & 3 & 0 & 7
\end{array}\right]$$

2) Multiplication of a row by a non-zero number.

Example.

$$\left[\begin{array}{cccc}
1 & 2 & 3 & 4 \\
0 & 1 & 5 & 1 \\
4 & 3 & 0 & 7
\right]$$

3) Addition of a multiple of one row to another row.

Example.

$$\left[\begin{array}{cccc}
1 & 2 & 3 & 4 \\
0 & 1 & 5 & 1 \\
4 & 3 & 0 & 7
\right]$$

# Proposition

Elementary row operations do not change solutions of the system of equations represented by a matrix.

