

The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations...

In the second part we consider the case of a linear system of equations. It is shown that under certain conditions the system has a unique solution...

3. The case of a linear system of equations

Let us consider the system of linear equations $Ax = b$, where A is an $n \times n$ matrix and b is a column vector. We assume that the matrix A is nonsingular...

It is well known that the system has a unique solution if and only if the determinant of the matrix A is not equal to zero...

Let us now consider the case of a singular matrix A . In this case the system may have no solution or an infinite number of solutions...

Let us assume that the rank of the matrix A is $r < n$. Then the system has solutions if and only if the rank of the augmented matrix $[A, b]$ is also r ...

4. The case of a singular matrix

Let us consider the case where the rank of the matrix A is $r < n$ and the rank of the augmented matrix $[A, b]$ is r . In this case the system has an infinite number of solutions...