Solving Linear Systems

Guilherme Novaes Lima

– February –
- 2023 -

Contents

1 Initial Analysis **3**
1.1 Elements 3
1.2 Classifying the system 3

2 Choosing the solution method **3**
2.1 Types of methods 3

3 Finally... Using the method of choice **3**
3.1 Gauss Elimination 3

1 Initial Analysis

1.1 Elements

When first analyzing a system of linear equations, you can characterize it based in a number of factors listed below.

$$n \rightarrow \text{Number of equations}$$

$$m \rightarrow \text{Number of unknown elements}$$

1.2 Classifying the system

After knowing the elements of the system, one can classify it accordingly:

- Independent system: Has exactly one solution ($m = n$).
- Dependent system: Has infinitely many solutions ($m > n$).
- Inconsistent: Has no solution ($m < n$)

2 Choosing the solution method

2.1 Types of methods

The methods used in solving linear systems can be divided into 2 major groups.

- Direct:
- Indirect:

3 Finally... Using the method of choice

3.1 Gauss Elimination

To use this method, one needs to find an equivalent system to the one being solved