

Introduction to Laboratory 6

Laboratory 6 concerns the implementation of the **Gaussian Elimination** method to solve a tridiagonal system of n equations. The coefficients a_j (for $j=2,\dots,n$), b_j (for $j=1,\dots,n$), c_j (for $j=1,\dots,n-1$) and r_j (for $j=1,\dots,n$) are given, and we want to find the solutions x_j (for $j=1,\dots,n$). It can be shown that the solutions x_j can be calculated using recursive relations (see Laboratory), in which we first need to calculate the coefficients β_j and ρ_j (for $j=1,\dots,n$) and then the solutions x_j .

In Laboratory 6 you have to implement the **Gaussian Elimination** method and find the solutions x_j of a tridiagonal system of 5 equations.

The program of this Laboratory will also be employed in the next Laboratory to calculate **Cubic Splines**.

Solutions:

The solutions of the system are:

$$x_1 = \frac{10}{3} \approx 3.33333$$

$$x_2 = \frac{20}{3} \approx 6.66667$$

$$x_3 = 9$$

$$x_4 = \frac{28}{3} \approx 9.33333$$

$$x_5 = \frac{20}{3} \approx 6.66667$$