Numerical Analysis: Lab 2

Gaussian Elimination Method

Input:

- Coefficient matrix A of size n×n
- RHS vector b of length n

Output:

- Solution vector x of length n

Algorithm: Forward Elimination

```
for k in range(n-1):
    for i in range(k+1, n):
        factor = A[i, k]/A[k, k]
        b[i] = b[i] - factor*b[k]

        for j in range(k, n):
            A[i, j] = A[i, j] - factor*A[k, j]
```

Algorithm: Back Substitution

```
x = np.zeros(n)
x[n-1] = b[n-1]/A[n-1, n-1]
for i in range(n-2, -1, -1):
    sum = b[i]
    for j in range(i+1, n):
        sum = sum - A[i, j]*x[j]
    x[i] = sum/A[i, i]
```