

## Exercise Sheet 2

### Exercise 1

Consider the Gauss Elimination Algorithm in its simplest form (elimination and backward substitution phases). Implement the algorithm together with **pivoting**, i.e. the swapping of rows according with the magnitude of the pivot element.

### Exercise 2

Test your algorithm on the linear problem:

$$\left( \begin{array}{cc|c} \epsilon & 2 & 4 \\ 1 & -1 & 1 \end{array} \right)$$

where  $\epsilon$  is a small number. Reduce progressively the magnitude of  $\epsilon$  towards zero and test that the Gauss algorithm with pivoting yields the correct result, while the version without pivoting eventually fails.

For which approximate value of  $\epsilon$  is pivoting necessary?