

Gaußsches Eliminationsverfahren:

$$\left[\begin{array}{ccc|ccc}
 u_{11} & \dots & & u_{1k} & \dots & u_{1n} \\
 \vdots & & & \vdots & & \vdots \\
 u_{k-1,1} & \dots & u_{k-1,k-1} & u_{k-1,k} & \dots & u_{k-1,n} \\
 \hline
 l_{k1} & \dots & l_{k,k-1} & a_{kk}^{(k-1)} & \dots & a_{kn}^{(k-1)} \\
 \vdots & & \vdots & \vdots & & \vdots \\
 l_{n1} & \dots & l_{n,k-1} & a_{nk}^{(k-1)} & \dots & a_{nn}^{(k-1)}
 \end{array} \right]
 \quad
 \begin{bmatrix}
 c_1 \\
 \vdots \\
 c_{k-1} \\
 \hline
 b_k^{(k-1)} \\
 \vdots \\
 b_n^{(k-1)}
 \end{bmatrix}$$

■ Algorithmus:

- Initialisieren: $A := [a_{ij}]_{i,j=1..n}$, $b = [b_i]_{i=1..n}$
- Zerlegen / Vorwärtseinsetzen:

```

FOR K:=1 STEP 1 UNTIL n-1 DO
  FOR i:=K+1 STEP 1 UNTIL n DO
     $a_{ik} := a_{ik} / a_{kk}$ 
     $b_i := b_i - a_{ik} b_k$ 
    FOR j:=K+1 STEP 1 UNTIL n DO
       $a_{ij} := a_{ij} - a_{ik} a_{kj}$ 
    END FOR
  END FOR
END FOR

```

- Rückwärtseinsetzen:

```

 $x_n := b_n / a_{nn} = c_n / u_{nn}$ 
FOR i:=n-1 STEP -1 UNTIL 1 DO
   $x_i := b_i / a_{ii}$ 
  FOR j:=i+1 STEP 1 UNTIL n DO
     $x_i := x_i - a_{ij} x_j$ 
  END FOR
END FOR

```