$Ax = b$

ex 2

$$\begin{bmatrix} 8 & 2 & 3 \\ 3 & 4 & 4 \\ 1 & 2 & 3 \end{bmatrix} \quad \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}$$

$A = L \cdot U$

$$L = \begin{bmatrix} 1 & 0 & 0 \\ l_{21} & 1 & 0 \\ l_{31} & l_{32} & 1 \end{bmatrix}, \quad U = \begin{bmatrix} u_{11} & u_{12} & u_{13} \\ 0 & u_{22} & u_{23} \\ 0 & 0 & u_{33} \end{bmatrix}$$

$$\Rightarrow U = \begin{bmatrix} 8 & 2 & 3 \\ 0 & u_{22} & u_{23} \\ 0 & 0 & u_{33} \end{bmatrix} \quad L \cdot U$$

$$l_{21} = \frac{a_{21}}{u_{11}} = \frac{3}{8} = 0{,}37$$

$$l_{31} = \frac{a_{31}}{a_{11}} = \frac{1}{8} = 0{,}12$$

$$u_{22} = a_{22} - l_{21} \cdot u_{12} = 4 - 0{,}37 \cdot 2 = 3{,}2$$

$$u_{23} = a_{23} - l_{21} \cdot u_{13} = 4 - 0{,}37 \cdot 3 = 2{,}8$$

$$l_{32} = \frac{1}{u_{22}} (a_{32} - (l_{31} \cdot u_{12}))$$

$$l_{32} = \frac{1}{3{,}2} (2 - 0{,}1 \cdot 2) = \frac{1{,}7}{3{,}2} = 0{,}5$$

$u_{33} = u_{33} - (l_{31} \cdot u_{13} + l_{32} \cdot u_{23})$

$u_{33} = 3 - (0{,}12 \cdot 3 + 0{,}15 \cdot 2{,}8)$

$= 3 - (0{,}3 + 1{,}5) = 3 - 1{,}9 = 1{,}10$

$\det(A) = \det(L) \cdot \det(U)$

$\det(L) = 1$

$\det(A) = u_{11} \cdot u_{22} \cdot u_{33} =$

$8 \cdot 3{,}1 \cdot 4{,}0 = 28$