Gausa Doolitla

Dla $i \in \{1, 2, 3, \dots, n\}$

$$u_{ij} = a_{ij} - \sum_{k=1}^{i-1} l_{ik} u_{kj} \quad \text{dla} \quad j \in \{i, i+1, i+\dots, n\}$$

$$l_{jk} = \frac{1}{u_{ii}} \left(a_{ji} - \sum_{k=1}^{i-1} l_{jk} u_{ki} \right) \quad \text{dla} \quad j \in \{i+1, \dots, n\}$$

$$\left[\begin{array}{cccc} 2 & 2 & 3 & 3 \\ 1 & -1 & 0 & -1 \\ -1 & 2 & 1 & 2 \end{array}\right]$$

L

$$\begin{bmatrix} 1 & 0 & 0 \\ \frac{1}{2} & 1 & 0 \\ -\frac{1}{2} & -\frac{3}{2} & 1 \end{bmatrix}$$

U

$$\begin{bmatrix} 2 & 2 & 3 \\ 0 & -2 & -\frac{3}{2} \\ 0 & 0 & \frac{1}{4} \end{bmatrix}$$

$W_1 = |2| = 2 \neq 0$

$W_2 = \begin{bmatrix} 2 & 2 \\ 1 & -1 \end{bmatrix} = -4 \neq 0$

$|A| = -2 + 6 - (3 + 2) = -1 \neq 0$

i = 1

$j = 1 \quad u_{11} = a_{11} - \sum_{k=1}^{1-1} 2$

$j = 2 \quad u_{12} = a_{12}$

$j = 3 \quad u_{13} = a_{13}$

$j = 2 \quad l_{21} = \frac{1}{u_{11}} \cdot (a_{21} - \sum_{k=1}^{0}) = \frac{a_{21}}{u_{11}} = \frac{1}{2}$

$j = 3 \quad l_{22} = \frac{1}{u_{11}} \cdot (a_{31}) = \frac{-1}{2}$

i = 2

$j = 2 \quad u_{22} = a_{22} - \sum_{k=1}^{1} l_{2k} u_{k2} = a_{22} - l_{21} u_{12} = -1 - \frac{1}{2} \cdot 2 = -2$

$j = 3 \quad u_{23} = a_{23} - l_{21} u_{13} = 0 - \frac{1}{2} \cdot 3 = -\frac{3}{2}$

$j = 3 \quad l_{32} = \frac{1}{u_{22}} \left(a_{32} - l_{31} u_{12} \right) = \frac{1}{-2} \left(2 - (-\frac{1}{2}) 2 \right) = -\frac{1}{2} (3) = -\frac{3}{2}$

i = 3

$j = 3 \quad u_{33} = a_{33} - \sum_{k=1}^{2} (l_{3k} u_{k3}) = a_{33} - (l_{31} u_{13} + l_{32} u_{23}) = 1 - [-\frac{1}{2} \cdot 3 + (-\frac{3}{2})(-\frac{3}{2})] =$

11.04.2012

$$\begin{cases} a_{11} x_1 + a_{12} x_2 + a_{13} x_3 + \dots + a_{1n} x_n = b_1 & / a_{11} \\ a_{21} x_1 + a_{22} x_2 + \dots + a_{2n} x_n = b_2 & / a_{22} \\ \vdots \end{cases}$$

$\bigwedge_{i \in \{1,2,\dots,n\}} a_{ii} \neq 0$ (na przekątnej nie stoi „0")

$$\begin{cases} x_1 + \frac{a_{12}}{a_{11}} x_2 + \dots + \frac{a_{1n}}{a_{11}} x_n = \frac{b_1}{a_{11}} \\ \frac{a_{12}}{a_{22}} x_1 + x_2 + \dots + \frac{a_{2n}}{a_{22}} x_n = \frac{b_2}{a_{22}} \\ \vdots \end{cases}$$