$c_i = \frac{b_i}{a_{ii}}$, $d_{ij} = -\frac{a_{ij}}{a_{ii}}$

$$\begin{cases} x_1 = c_1 + \quad + d_{12}x_2 + \ldots + d_{1n}x_n \\ x_2 = c_2 + d_{21}x_1 \quad + \ldots + d_{2n}x_n \\ \vdots \\ x_n = c_n + d_{n1}x_1 + d_{n2}x_2 + \ldots \end{cases}$$

$$\begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix} = \begin{bmatrix} c_1 \\ c_2 \\ \vdots \\ c_n \end{bmatrix} + \begin{bmatrix} 0 & d_{12} & \ldots & d_{1n} \\ d_{21} & 0 & \ldots & d_{2n} \\ \vdots \\ d_{n1} & d_{n2} & \ldots & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix}$$

$X = C + Dx$

$x^{(k+1)} = C + Dx^{(k)}$, wartości wektora „x" w kolejnych iteracjach.

$$\bigwedge_{i \in \{1,2,\ldots n\}} |a_{ii}| > \sum_{\substack{j=1 \\ j \neq i}}^{n} |a_{ij}|$$

$$\bigwedge_{j \in \{1,2,\ldots n\}} |a_{ii}| > \sum_{\substack{i=1 \\ j \neq i}}^{n} |a_{ij}|$$

Rozwiązanie metodą iteracji prostej

$$\begin{bmatrix} -1 & 5 & -1 \\ 2 & 4 & 8 \\ 3 & 1 & -1 \end{bmatrix} x = \begin{bmatrix} 10 \\ 2 \\ 6 \end{bmatrix} \qquad x = \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}, \text{ rozwiązanie}$$

$$\begin{bmatrix} 3 & 1 & -1 \\ -1 & 5 & -1 \\ 2 & 4 & 8 \end{bmatrix} x = \begin{bmatrix} 6 \\ 10 \\ 2 \end{bmatrix}$$

$$\begin{cases} 3x_1 + x_2 - x_3 = 6 \;/:3 & |3| \overset{\vee}{>} (|1| + |-1|) \\ -x_1 + 5x_2 - x_3 = 10 \;/:5 & |5| \overset{\vee}{>} |-1| + |-1| \\ 2x_1 + 4x_2 + 8x_3 = 2 \;/:8 & |8| \overset{\vee}{>} |2| + |4| \end{cases}$$

$$\begin{cases} x_1 + \frac{1}{3}x_2 - \frac{1}{3}x_3 = 2 \\ -\frac{1}{5}x_1 + x_2 - \frac{1}{5}x_3 = 2 \\ \frac{1}{4}x_1 + \frac{1}{2}x_2 + x_3 = \frac{1}{4} \end{cases}$$

$$\begin{cases} x_1 = 2 \quad - \frac{1}{3}x_2 + \frac{1}{3}x_3 \\ x_2 = 2 + \frac{1}{5}x_1 \quad + \frac{1}{5}x_3 \\ x_3 = \frac{1}{4} - \frac{1}{4}x_1 - \frac{1}{2}x_2 \end{cases}$$

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 2 \\ 2 \\ \frac{1}{4} \end{bmatrix} + \begin{bmatrix} 0 & -1/3 & 1/3 \\ 1/5 & 0 & 1/5 \\ -1/4 & -1/2 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

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