Метод на Прогонката

$$\begin{cases} 5x_1 + 3x_2 = 8 \\ 3x_1 + 6x_2 + x_3 = 10 \\ x_2 + 4x_3 - 2x_4 = 3 \\ x_3 - 3x_4 = -2 \end{cases}$$

$-\beta_i$, γ_i, α_i, δ_i

$$\left(\begin{array}{cccc|c} 5 & 3 & 0 & 0 & 8 \\ 3 & 6 & 1 & 0 & 10 \\ 0 & 1 & 4 & -2 & 3 \\ 0 & 0 & 1 & -3 & -2 \end{array}\right)$$

формули:

(1) $P_i = \dfrac{\gamma_i}{\beta_i - \alpha_i P_{i-1}}$; (2) $Q_i = \dfrac{\alpha_i Q_{i-1} - \delta_i}{\beta_i - \alpha_i P_{i-1}}$

(3) $x_{i-1} = P_{i-1} x_i + Q_{i-1}$

(1) P_1, Q_1, $\alpha_1 = 0$

$P_1 = \dfrac{\gamma_1}{\beta_1} = -\dfrac{3}{5}$; $Q_1 = -\dfrac{\delta_1}{\beta_1} = +\dfrac{8}{5}$

2) P_2, Q_2

$P_2 = \dfrac{1}{-6 - 3 \cdot \left(-\frac{3}{5}\right)} = \dfrac{1}{-\frac{30}{5} + \frac{9}{5}} = -\dfrac{5}{21}$

$Q_2 = \dfrac{3\left(-\frac{8}{5}\right) - 10}{-6 - 3 \cdot \left(-\frac{3}{5}\right)} = \dfrac{-\frac{24}{5} - \frac{50}{5}}{-\frac{21}{5}} = +\dfrac{26}{21}$

(3) P_3, Q_3

$P_3 = \dfrac{-2}{-4 - 1\left(-\frac{5}{21}\right)} = \dfrac{-2}{-\frac{84}{21} + \frac{5}{21}} = +\dfrac{42}{79}$

$Q_3 = \dfrac{1\left(\frac{26}{21} - 3\right)}{-4 - 1\left(-\frac{5}{21}\right)} = \dfrac{\frac{26 - 63}{21}}{-\frac{79}{21}} = +\dfrac{37}{79}$

(4) P_4, Q_4

$P_4 = 0$, $Q_4 = \dfrac{1\left(\frac{37}{79}\right) + 2}{+3 - 1\left(\frac{42}{79}\right)} = \dfrac{\frac{37 + 158}{79}}{\frac{279 - 42}{79}} = \dfrac{195}{237}$

$x_4 = Q_4 = \dfrac{195}{237} \sim 1$

$x_3 = P_3 \cdot x_4 + Q_3 = \dfrac{42}{79} \cdot 1 + \dfrac{37}{79} = 1$

$x_2 = P_2 x_3 + Q_2 = -\dfrac{5}{21} \cdot 1 + \dfrac{26}{21} = 1$

$x_1 = P_1 x_2 - Q_1 = -\dfrac{3}{5} \cdot 1 + \dfrac{8}{5} = 1$