2.4. Auflösung tridiagonaler GS $K\underline{u}=\underline{f}$

$$(4)\qquad \begin{bmatrix} c_1 & -b_1 & & 0 \\ -a_2 & c_2 & -b_2 & \\ & \ddots & \ddots & \ddots \\ & -a_{n-1} & c_{n-1} & -b_{n-1} \\ 0 & & -a_n & c_n \end{bmatrix} \begin{bmatrix} u_1 \\ u_2 \\ \vdots \\ u_{n-1} \\ u_n \end{bmatrix} = \begin{bmatrix} f_1 \\ f_2 \\ \vdots \\ f_{n-1} \\ f_n \end{bmatrix}$$

$$\begin{array}{lll}
\alpha_1 := b_1/c_1, & \beta_1 := f_1/c_1 & u_1 := \alpha_1 u_2 + \beta_1 \\
\alpha_2 := b_2/\Delta_2, & \beta_2 := (f_2 + a_2\beta_1)/\Delta_2 & u_2 := \alpha_2 u_3 + \beta_2 \\
\vdots & \vdots & \vdots \\
\alpha_{n-1} := b_{n-1}/\Delta_{n-1}, & \beta_{n-1} := (f_{n-1} + a_{n-1}\beta_{n-2})/\Delta_{n-1} & u_{n-1} := \alpha_{n-1}u_n + \beta_{n-1} \\
 & \beta_n := (f_n + a_n\beta_{n-1})/\Delta_n & u_n := \beta_n
\end{array}$$

$$\Delta_i := c_i - a_i\alpha_{i-1}$$

$$\underbrace{\begin{bmatrix} c_1 & & & 0 \\ -a_2 & \Delta_2 & & \\ & \ddots & \ddots & \\ & -a_{n-1} & \Delta_{n-1} & \\ 0 & & -a_n & \Delta_n \end{bmatrix}}_{L} \cdot \underbrace{\underbrace{\begin{bmatrix} 1 & -\alpha_1 & & 0 \\ & 1 & -\alpha_2 & \\ & & \ddots & \ddots \\ & & 1 & -\alpha_{n-1} \\ 0 & & & 1 \end{bmatrix}}_{U} \begin{bmatrix} u_1 \\ u_2 \\ \vdots \\ u_{n-1} \\ u_n \end{bmatrix}}_{=\underline{\beta}} = \begin{bmatrix} f_1 \\ f_2 \\ \vdots \\ f_{n-1} \\ f_n \end{bmatrix}$$

$$L\,U\,\underline{u} = \underline{f}$$

$$Q = \#ops = 8n - 7$$