Step-1

Consider $x_1 = x_0 + y$. Here $LUy = r$, where $r = b - Ax_0$. We get

$$\begin{aligned} x_1 &= x_0 + y \\ LUx_1 &= LUx_0 + LUy \\ &= LUx_0 + r \end{aligned}$$

$$\begin{aligned} LUx_1 &= LUx_0 + b - Ax_0 \\ &= (LU - A)x_0 + b \end{aligned}$$

Step-2

Comparing this with $Sx_1 = Tx_0 + b$, we get

$$\boxed{\begin{aligned} S &= LU \\ T &= LU - A \end{aligned}}$$

It should be clear that T is very small.