$$x_{k+1} = A_0 x_{k+1} \oplus A_1 x_k \oplus B_2 u_{k+1}$$

$$\underbrace{\begin{vmatrix} 10 & \varepsilon & 3 & \varepsilon & 1 \\ \varepsilon & \varepsilon & \varepsilon & \varepsilon & \varepsilon \\ \varepsilon & \varepsilon & \varepsilon & \varepsilon & \varepsilon \\ \varepsilon & \varepsilon & \varepsilon & \varepsilon & \varepsilon \\ \varepsilon & \varepsilon & \varepsilon & \varepsilon & \varepsilon \end{vmatrix}}_{A_1} \underbrace{\begin{vmatrix} 0 \\ \varepsilon \\ \varepsilon \\ \varepsilon \\ \varepsilon \end{vmatrix}}_{x_k} = \begin{vmatrix} 10 \\ \varepsilon \\ \varepsilon \\ \varepsilon \\ \varepsilon \end{vmatrix}$$

Beispiel berechnen:

$$\underbrace{\begin{vmatrix} \varepsilon & \varepsilon & \varepsilon & \varepsilon & \varepsilon \\ 5 & \varepsilon & \varepsilon & \varepsilon & \varepsilon \\ 3 & \varepsilon & \varepsilon & \varepsilon & \varepsilon \\ \varepsilon & 1 & 2 & \varepsilon & \varepsilon \\ \varepsilon & 6 & \varepsilon & 3 & \varepsilon \end{vmatrix}}_{A_0} \underbrace{\begin{vmatrix} x_{1,1} \\ x_{1,2} \\ x_{1,3} \\ x_{1,4} \\ x_{1,5} \end{vmatrix}}_{x_{k+1}} \Rightarrow \begin{aligned} x_{1,1} &= \max(\varepsilon, 10) = 10 \\ x_{1,2} &= \max(5 + x_{1,1}, \varepsilon) = 15 \\ x_{1,3} &= \max(3 + x_{1,1}, \varepsilon) = 13 \\ x_{1,4} &= \max(x_{1,2}+1, x_{1,3}+2) = \max(16, 15) = 16 \\ x_{1,5} &= \max(x_{1,2}+6, x_{1,4}+3) = \max(21, 19) = 21 \end{aligned}$$

i=2 $\quad x_{k+1} = A_0^2 x_{k+1} \oplus A_0 A_1 x_k \oplus A_0 B_2 u_{k+1} \oplus A_1 x_k \oplus B_2 u_{k+1}$

i=2 $\quad x_{k+1} = A_0^2 x_{k+1} \oplus (A_0 \oplus I) A_1 x_k \oplus (A_0 \oplus I) B_2 u_{k+1}$

i=n $\quad x_{k+1}\ A_0^n x_{k+1} \oplus (A_0^{n-1} \oplus A_0^{n-2} \oplus \cdots \oplus A_0 \oplus I) A_1 x_k \oplus (A_0^{n-1} \oplus A_0^{n-2} \oplus \cdots \oplus A_0 \oplus I) B_2 u_{k+1}$

$A_0^* = A_0^{n-1} \oplus A_0^{n-2} \oplus \cdots A_0 \oplus I$; A_0 ist zyklenfrei $\Rightarrow \forall a_{ij} \in A_0^n = \varepsilon$

$$\Rightarrow x_{k+1} = A_0^* A_1 x_k \oplus A_0^* B_2 u_{k+1}$$

$$\underbrace{\begin{vmatrix} 0 & \varepsilon & \varepsilon & \varepsilon & \varepsilon \\ 5 & 0 & \varepsilon & \varepsilon & \varepsilon \\ 3 & \varepsilon & 0 & \varepsilon & \varepsilon \\ 6 & 1 & 2 & 0 & \varepsilon \\ 11 & 6 & 5 & 3 & 0 \end{vmatrix}}_{A_0^*} \underbrace{\begin{vmatrix} 10 & \varepsilon & 3 & \varepsilon & 1 \\ \varepsilon & \varepsilon & \varepsilon & \varepsilon & \varepsilon \\ \varepsilon & \varepsilon & \varepsilon & \varepsilon & \varepsilon \\ \varepsilon & \varepsilon & \varepsilon & \varepsilon & \varepsilon \\ \varepsilon & \varepsilon & \varepsilon & \varepsilon & \varepsilon \end{vmatrix}}_{A_1} = \underbrace{\begin{vmatrix} 10 & \varepsilon & 3 & \varepsilon & 1 \\ 15 & \varepsilon & 8 & \varepsilon & 6 \\ 13 & \varepsilon & 6 & \varepsilon & 4 \\ 16 & \varepsilon & 9 & \varepsilon & 7 \\ 21 & \varepsilon & 14 & \varepsilon & 12 \end{vmatrix}}_{M} ; \; B_M = A_0^* B_2 = \begin{vmatrix} \varepsilon \\ \varepsilon \\ 2 \\ 4 \\ 7 \end{vmatrix}$$