

Chemisches Analogcomputermodell für ein Flip-Flop

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Gliederung

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- ▶ 2. NAND Flip-Flop
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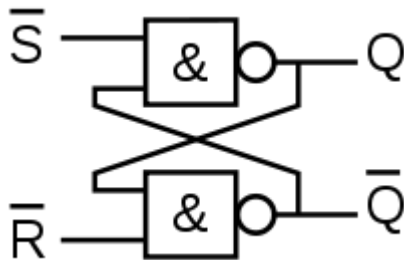


1. Aufgabenstellung

- ▶ chemisches Analogcomputermodell für ein Flip-Flop
- ▶ Modell aufstellen und Simulationsfallstudien mit Copasi durchführen
- ▶ Genauigkeitsabschätzung: benötigte Modellzeit (in Abhängigkeit der einzelnen k 's), um Ergebnis auf 5 Dezimalstellen genau zu erhalten



2. NAND Flip-Flop

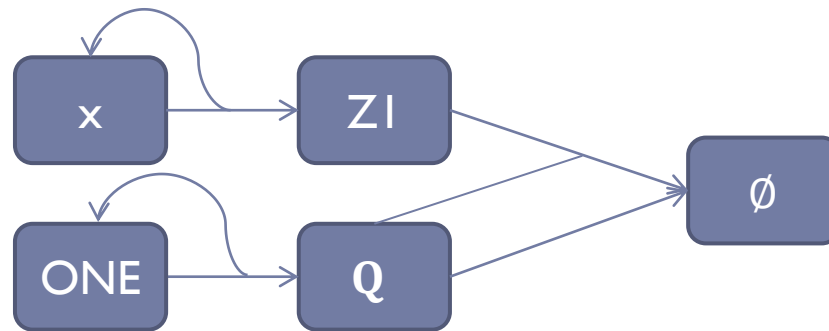


\bar{S}	\bar{R}	Q
1	1	vorheriger Zustand
0	1	1
1	0	0
0	0	$Q = \bar{Q} = 1$ (undefiniert)



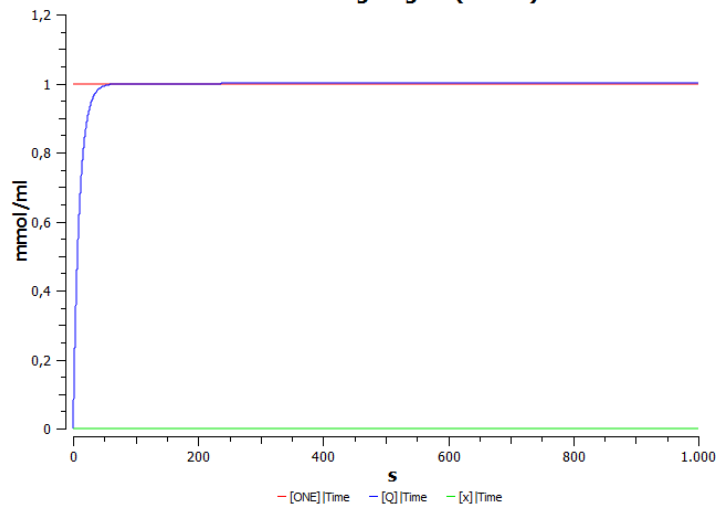
3. Negation

$$\text{NEGATION}(x) = 1 - x$$

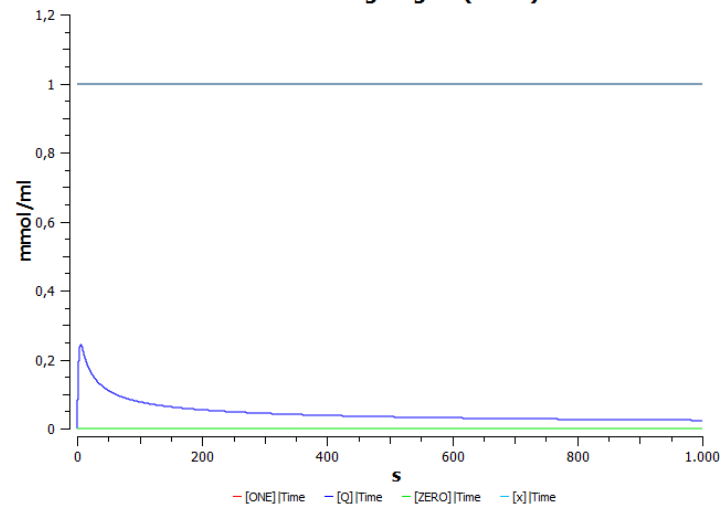


3. Negation

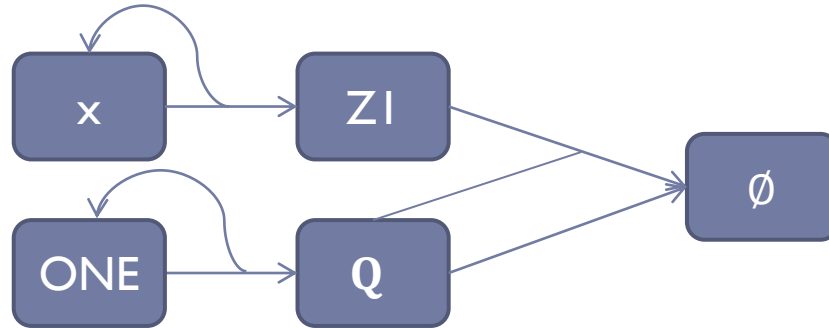
Berechnung Negiert(FALSE)



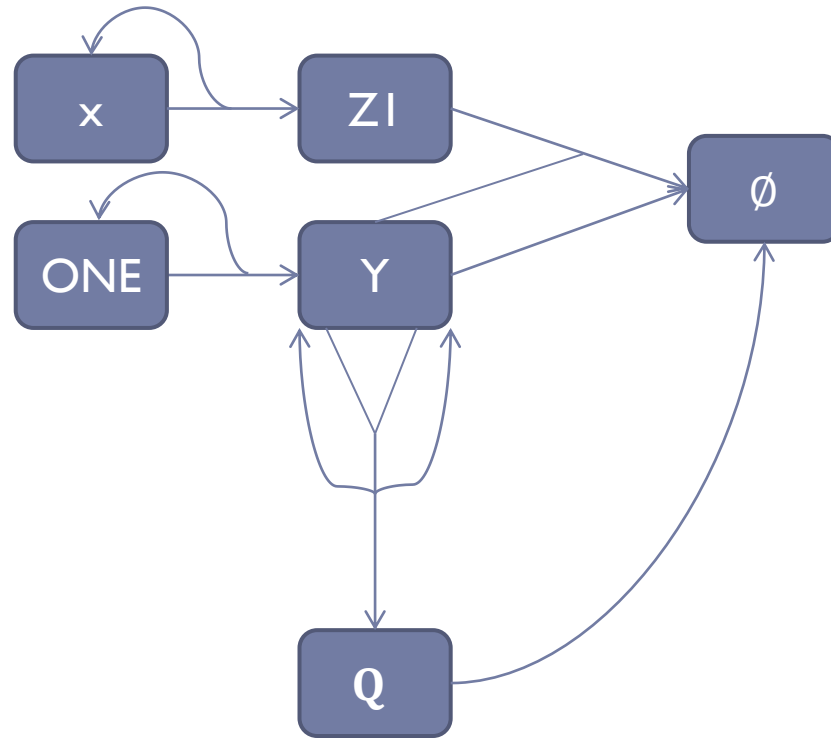
Berechnung Negiert(TRUE)



3. Negation

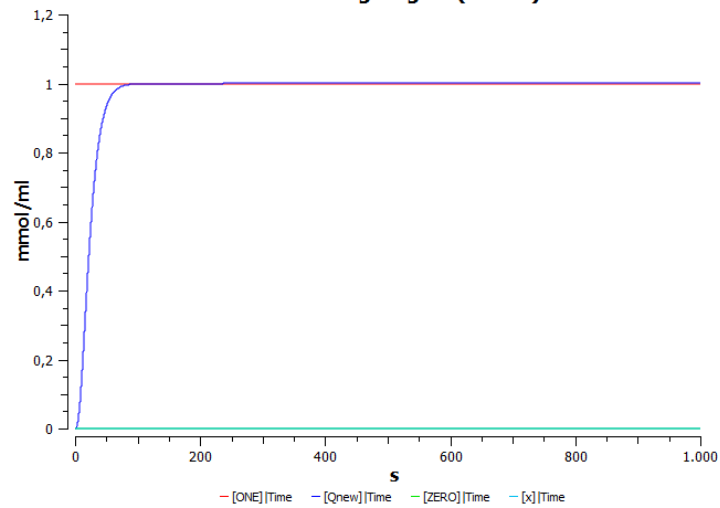


3. Negation

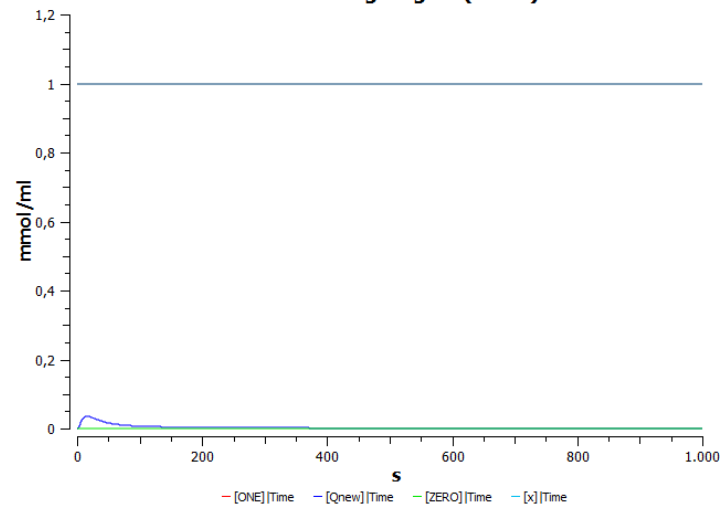


3. Negation

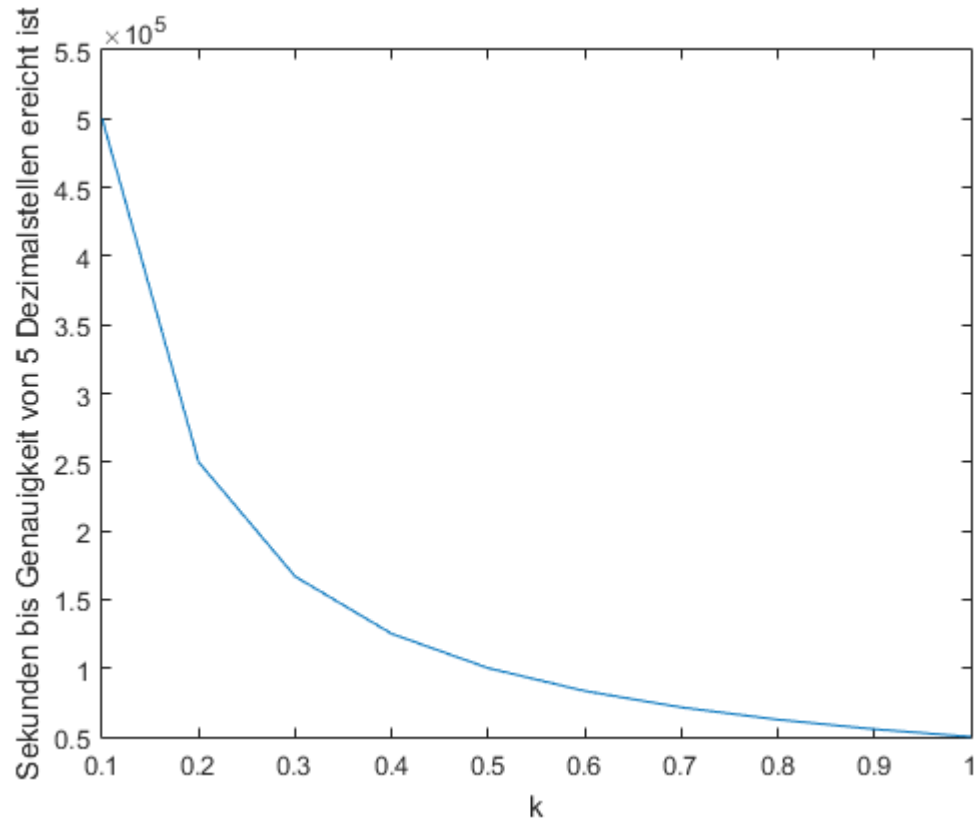
Berechnung Negiert(FALSE)



Berechnung Negiert(TRUE)

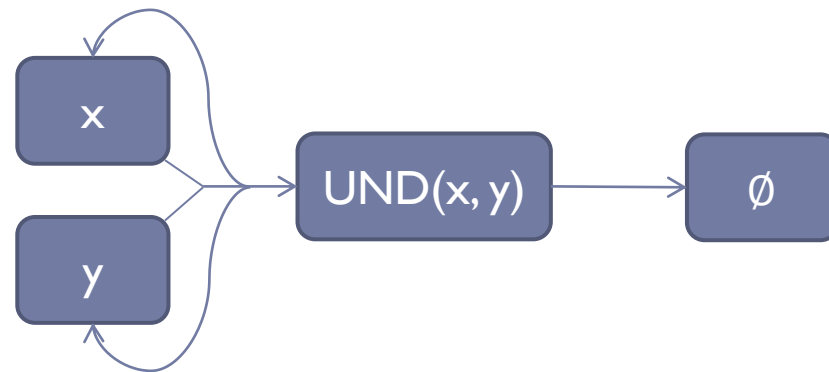


3. Negation



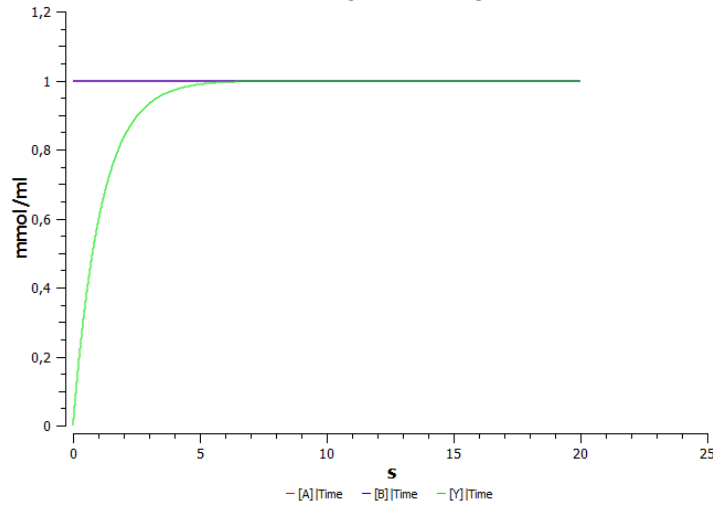
4. UND-Funktion

$$\text{UND}(x, y) = x * y$$

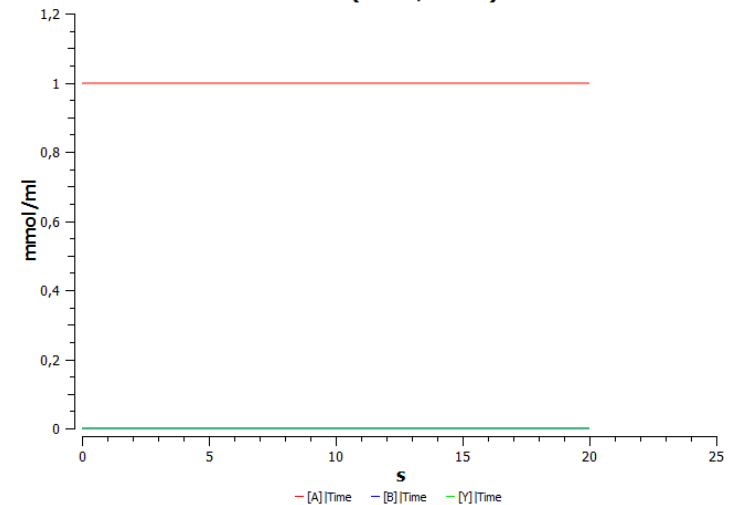


4. UND-Funktion

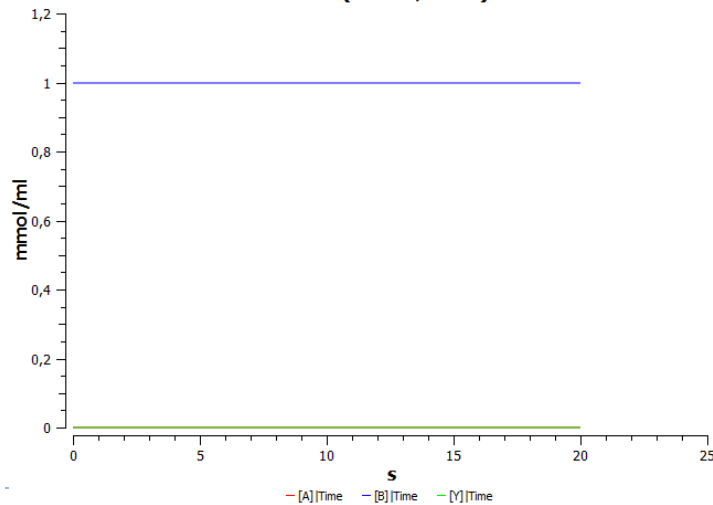
UND(TRUE,TRUE)



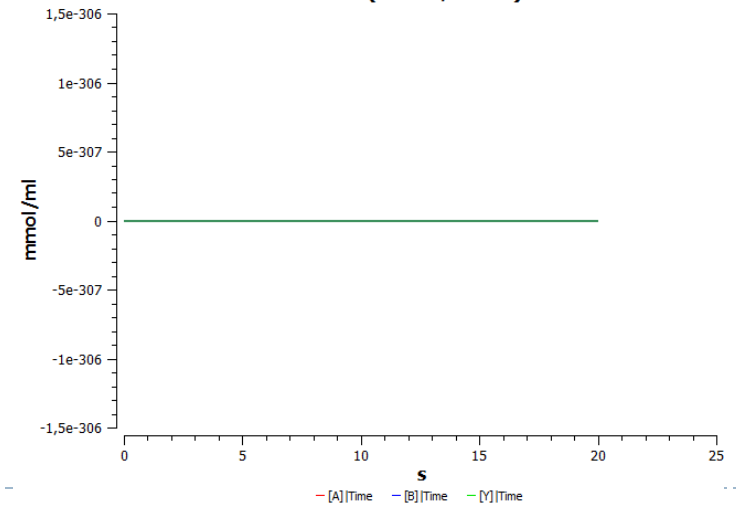
UND(TRUE,FALSE)



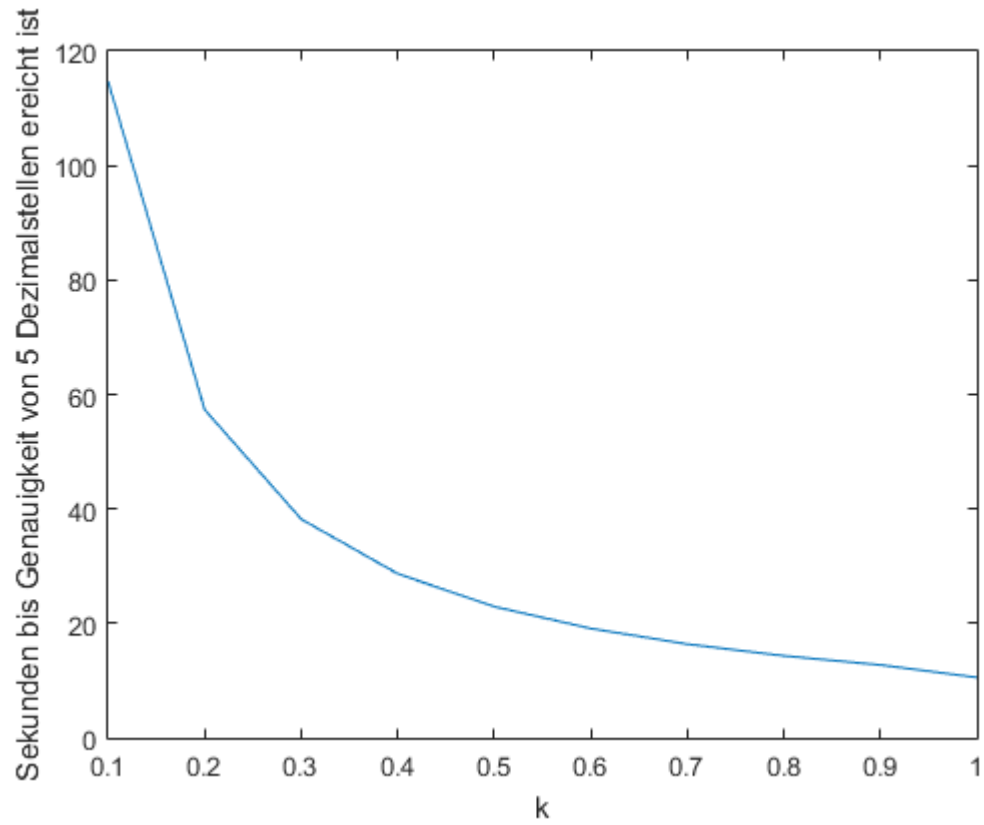
UND(FALSE,TRUE)



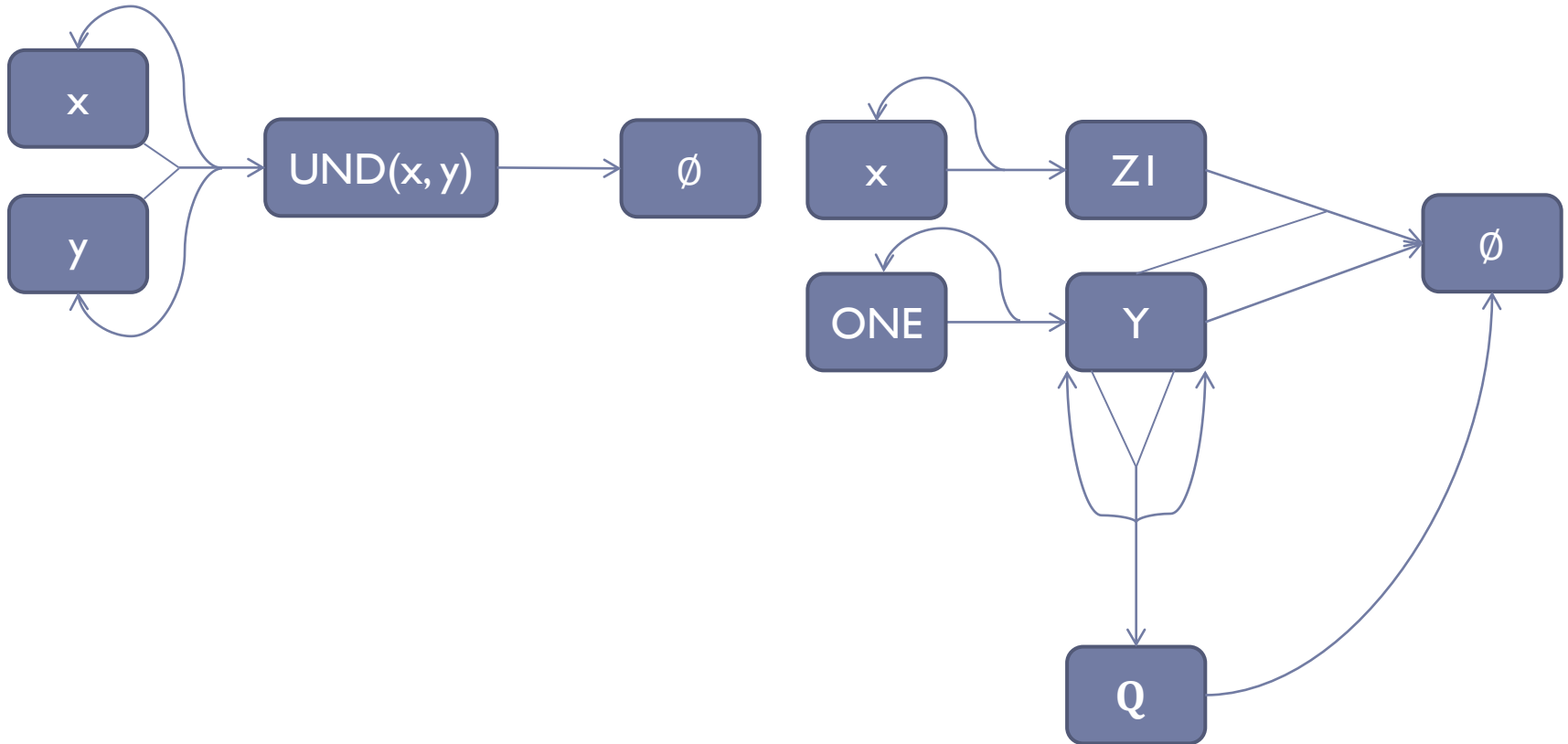
UND(FALSE,FALSE)



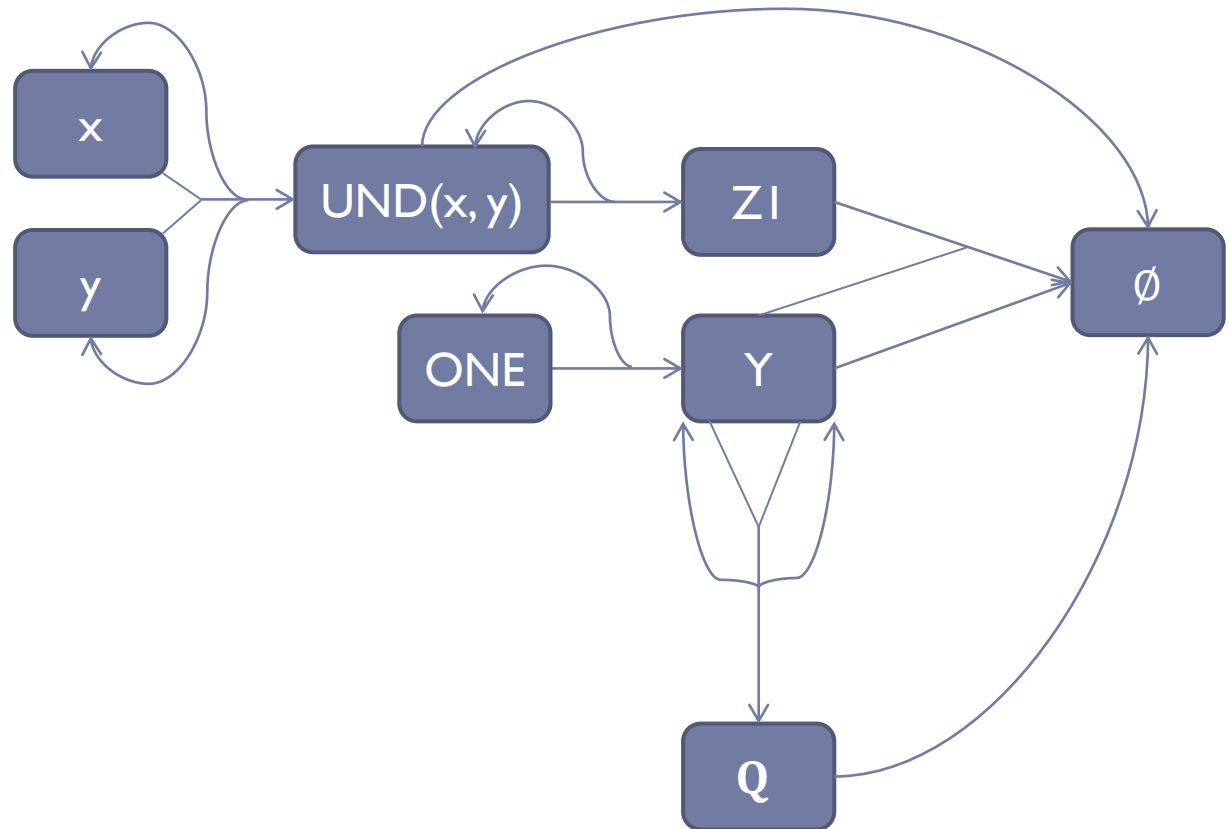
4. UND-Funktion



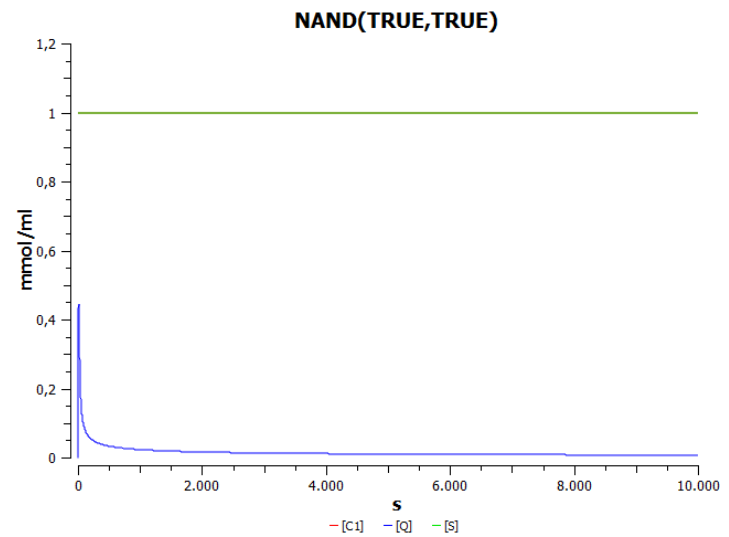
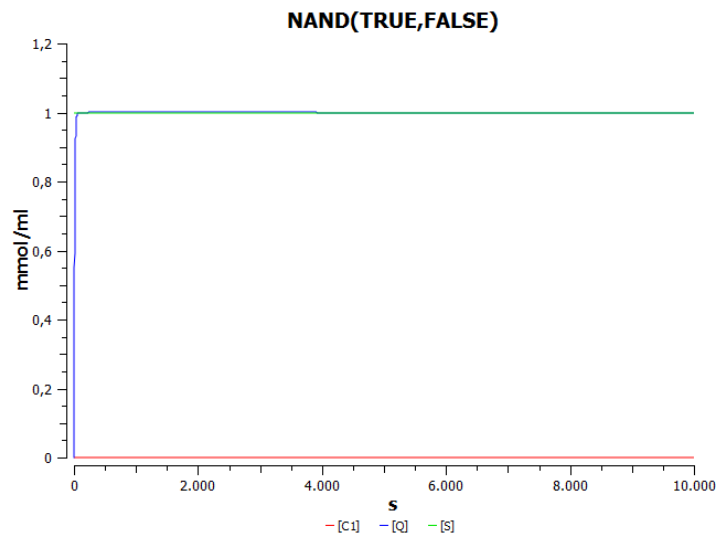
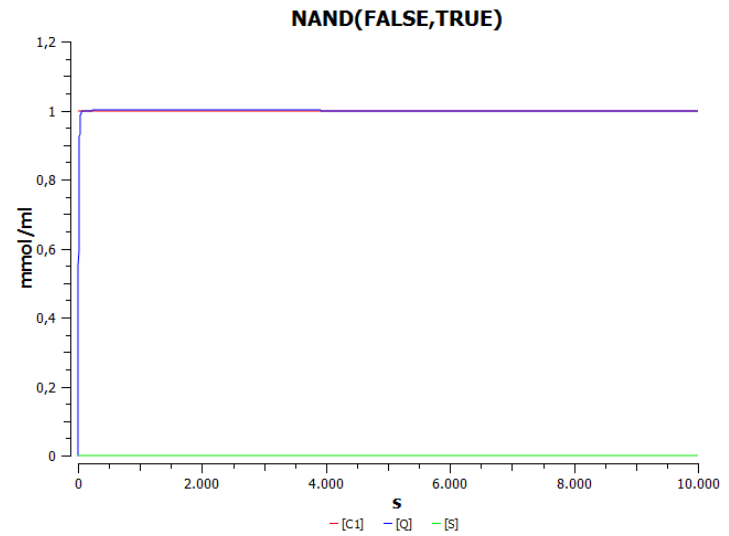
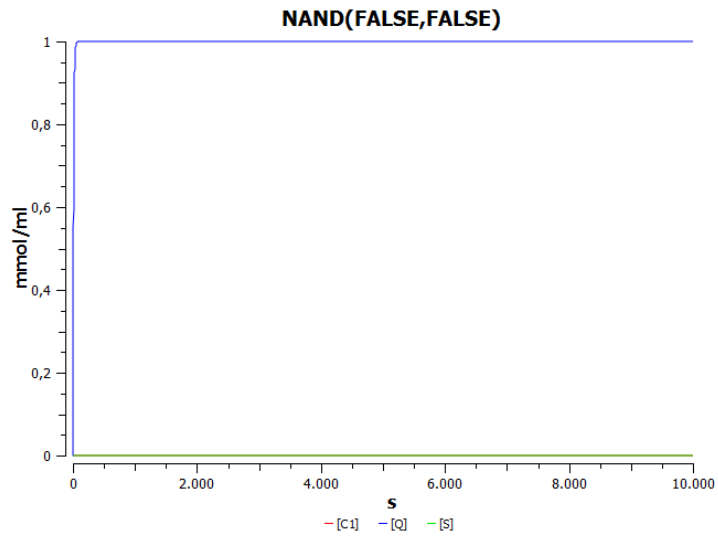
5. NAND



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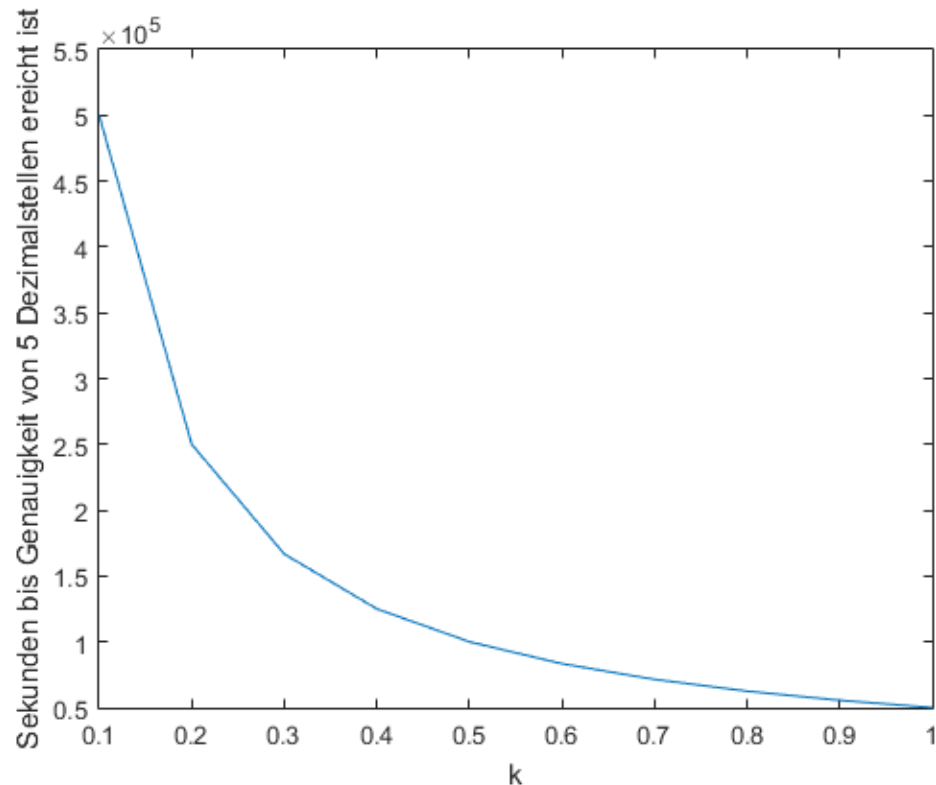


5. NAND

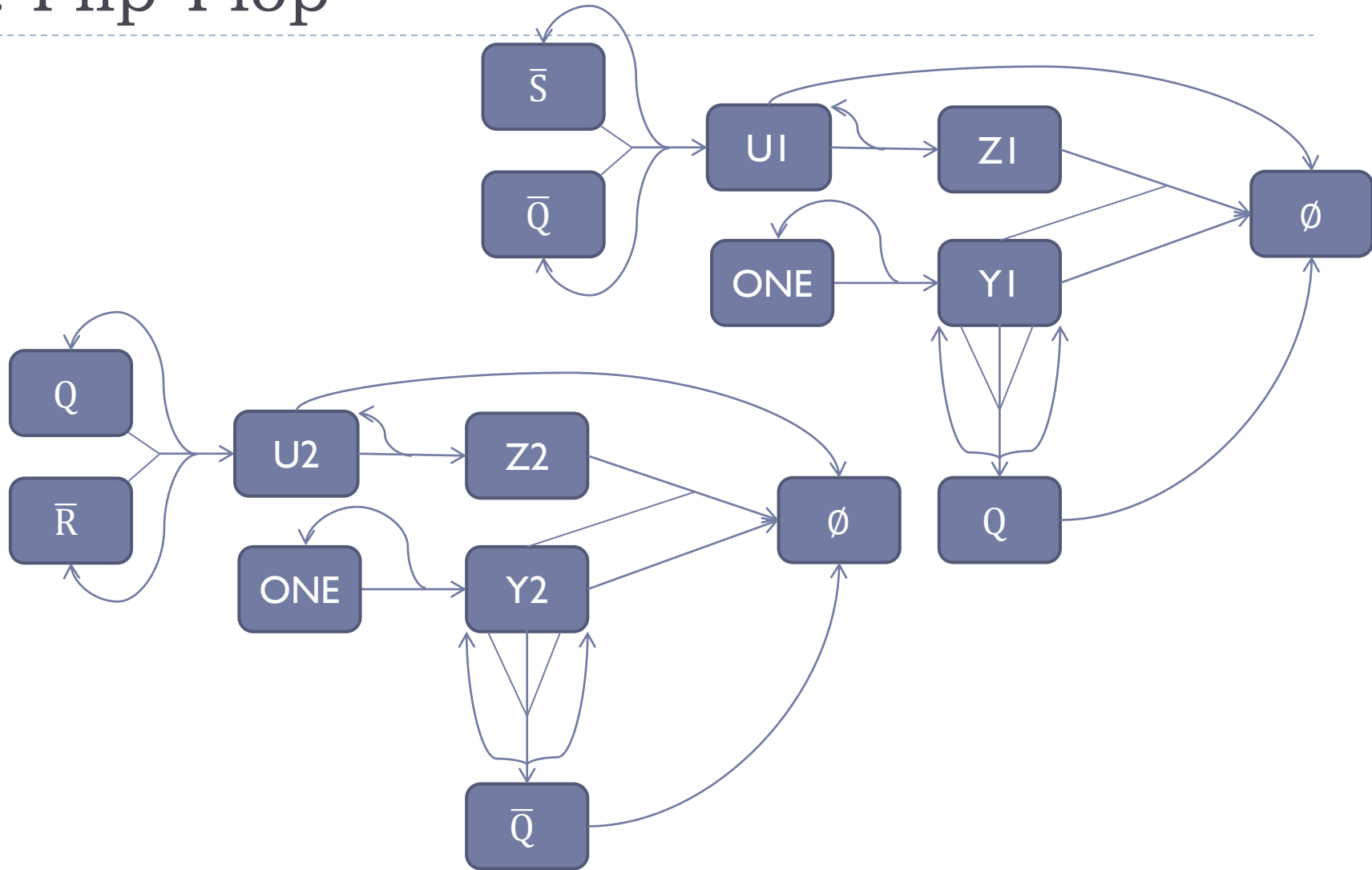


5. NAND

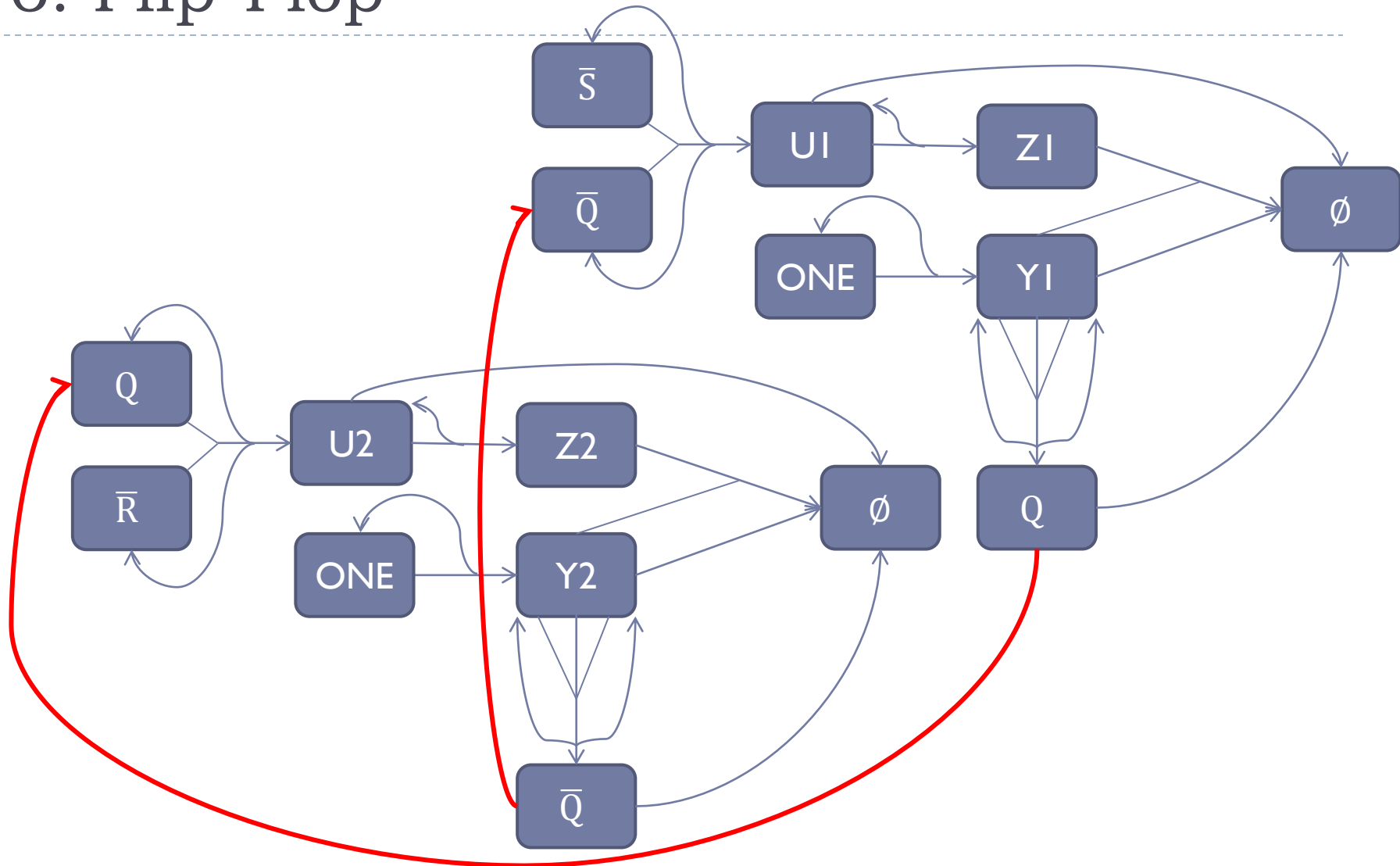
- ▶ Die einzige Ratenkonstante die zu Verbesserungen führt, ist das k von der Reaktion $Z + Y \rightarrow \emptyset$. Welche in der Negation verwendet wird.



6. Flip-Flop

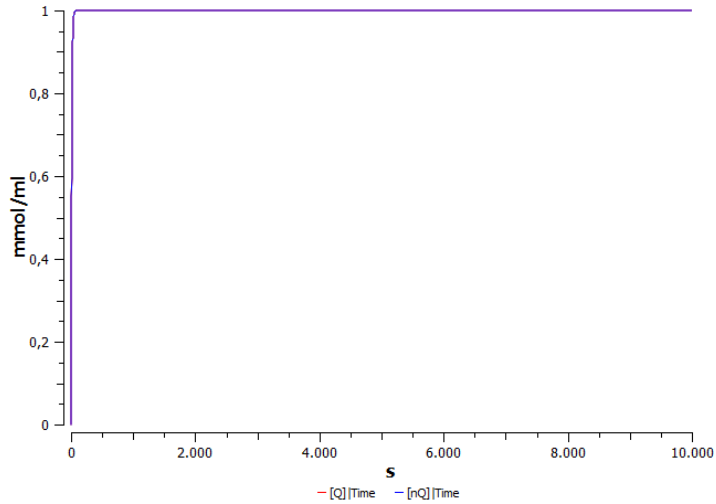


6. Flip-Flop

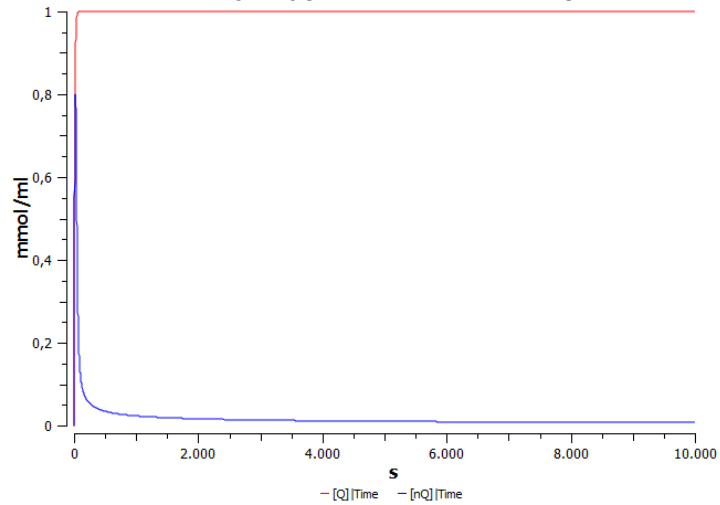


6. Flip-Flop

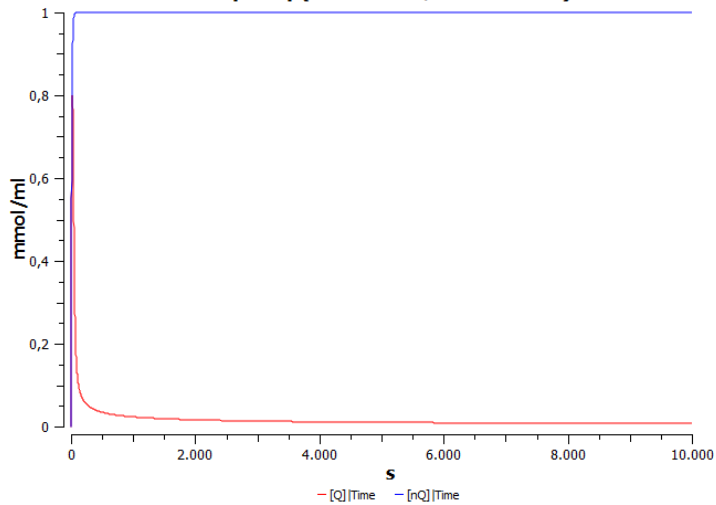
Flip-Flop(nS = FALSE, nR = FALSE)



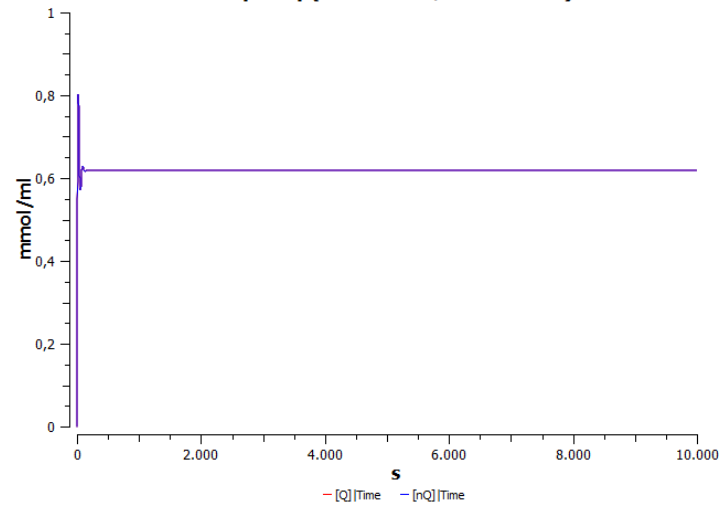
Flip-Flop(nS = FALSE, nR = TRUE)



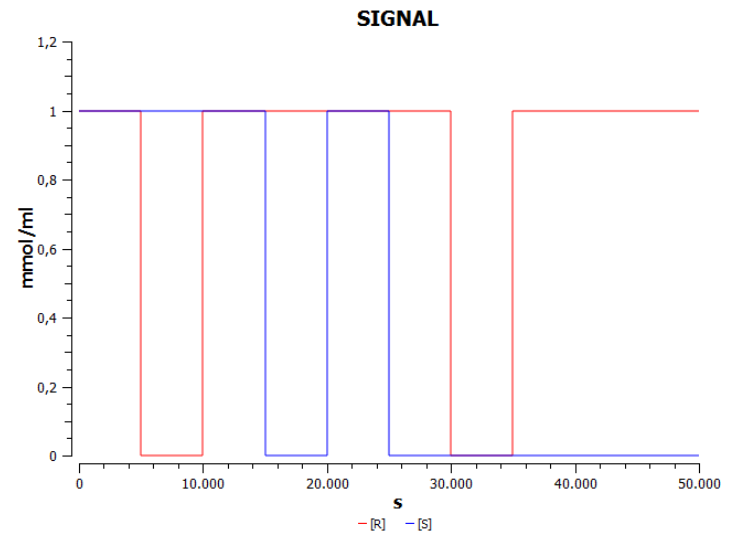
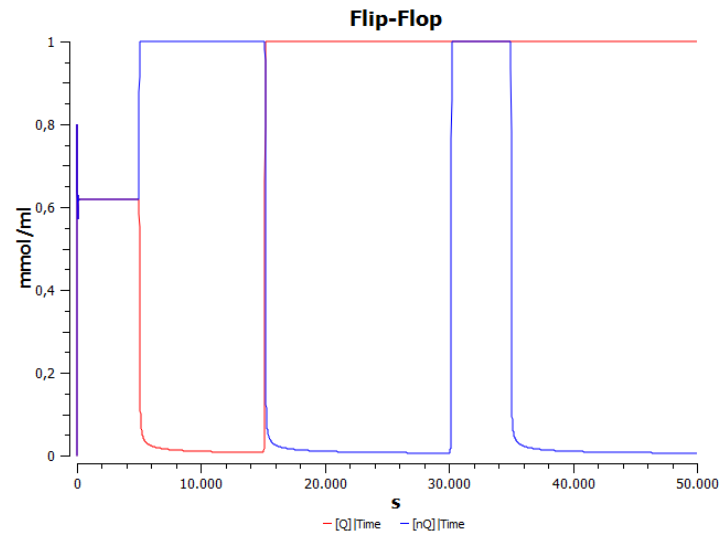
Flip-Flop(nS = TRUE, nR = FALSE)



Flip-Flop(nS = TRUE, nR = TRUE)



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