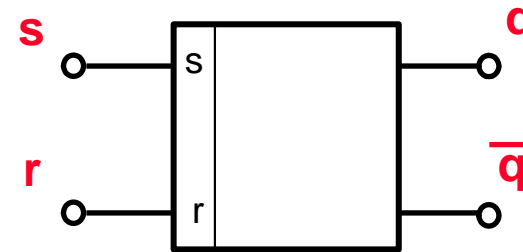


s	r	q^t	q^{t+1}
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	g
1	1	1	g

Charakteristische Tabelle des Grund-Flip-Flop



Logiksymbol des Grund-Flip-Flop

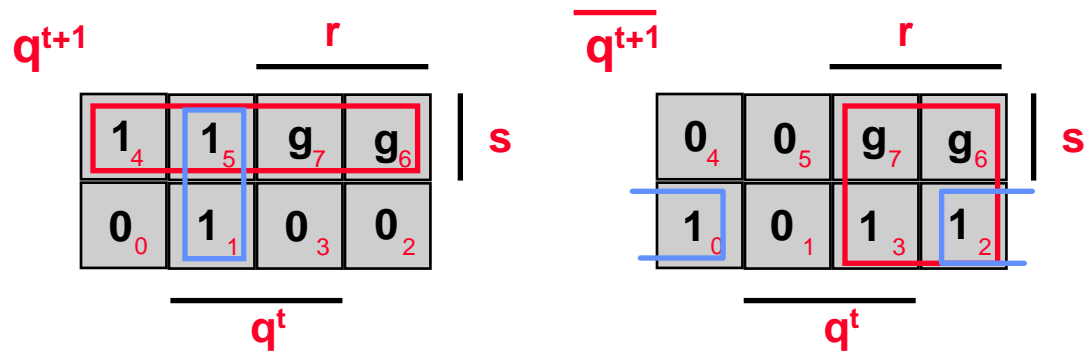
s	r	q^{t+1}
0	0	q^t
0	1	0
1	0	1
1	1	g

Charakteristische Tabelle des Grund-Flip-Flop (Kurzform)

$$\overline{q^{t+1}} = \overline{s} \overline{r} \overline{q^t} \vee \overline{s} r 1 \vee s \overline{r} 0 \vee s r g$$

$$q^{t+1} = \overline{s} \overline{r} q^t \vee \overline{s} r 0 \vee s \overline{r} 1 \vee s r g$$

s	r	q^{t+1}	$\overline{q^{t+1}}$
0	0	q^t	$\overline{q^t}$
0	1	0	1
1	0	1	0
1	1	g	g



Charakteristische Gleichungen
des Grund-Flip-Flop

$$q^{t+1} = \overline{r} q^t \vee s$$

$$\overline{q^{t+1}} = \overline{s} q^t \vee r$$

$$q^{t+1} = \overline{\overline{r}q^t \vee s} = \overline{\overline{r}q^t} \overline{s}$$

$$\overline{q^{t+1}} = \overline{\overline{s}q^t \vee r} = \overline{\overline{s}q^t} \overline{r}$$

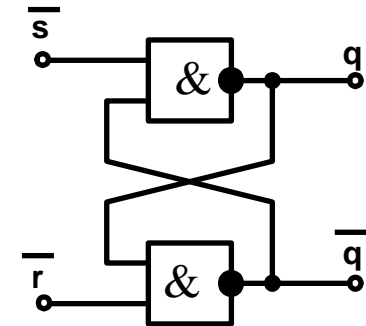
$$q^{t+1} = \overline{r}q^t \vee s$$

$$\overline{q^{t+1}} = \overline{s}q^t \vee r$$

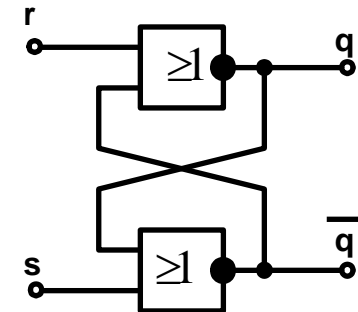
$$\overline{q^{t+1}} = \overline{\overline{r}q^t \vee s} = \overline{(\overline{r \vee q^t}) \overline{s}} = \overline{\overline{r \vee q^t}} \overline{\overline{s}} = r \vee q^t \vee s$$

$$\overline{\overline{q^{t+1}}} = \overline{\overline{\overline{s}q^t \vee r}} = \overline{\overline{(s \vee q^t)} \overline{r}} = \overline{\overline{s \vee q^t}} \overline{\overline{r}} = s \vee q^t \vee r$$

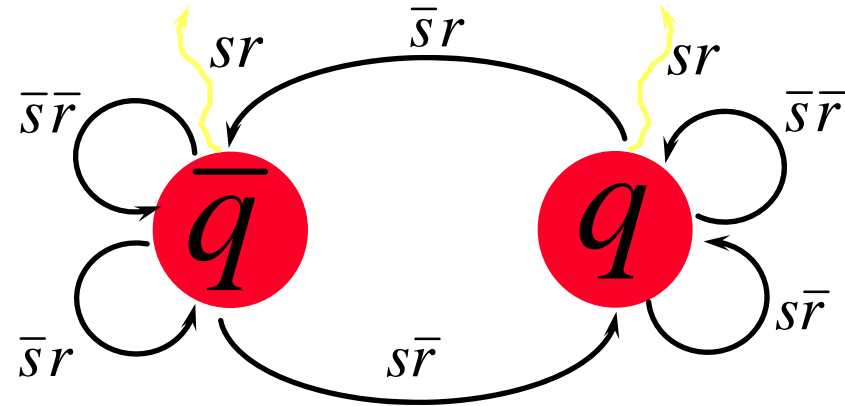
Nand



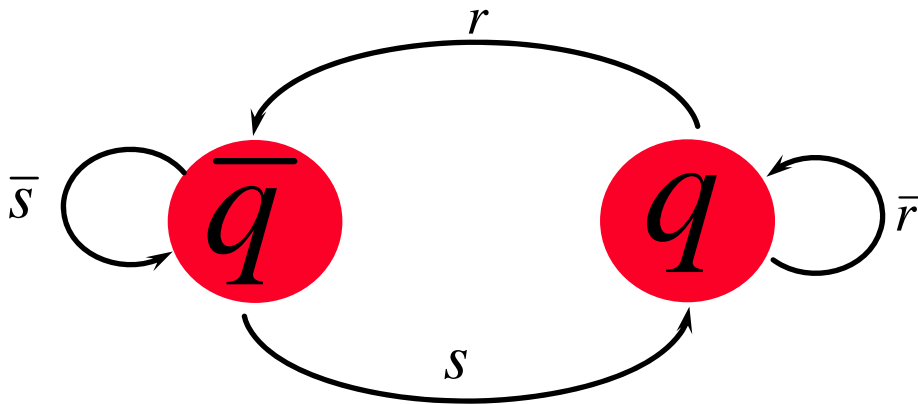
Nor



s	r	q^{t+1}	\overline{q}^{t+1}
0	0	q^t	\overline{q}^t
0	1	0	1
1	0	1	0
1	1	g	g



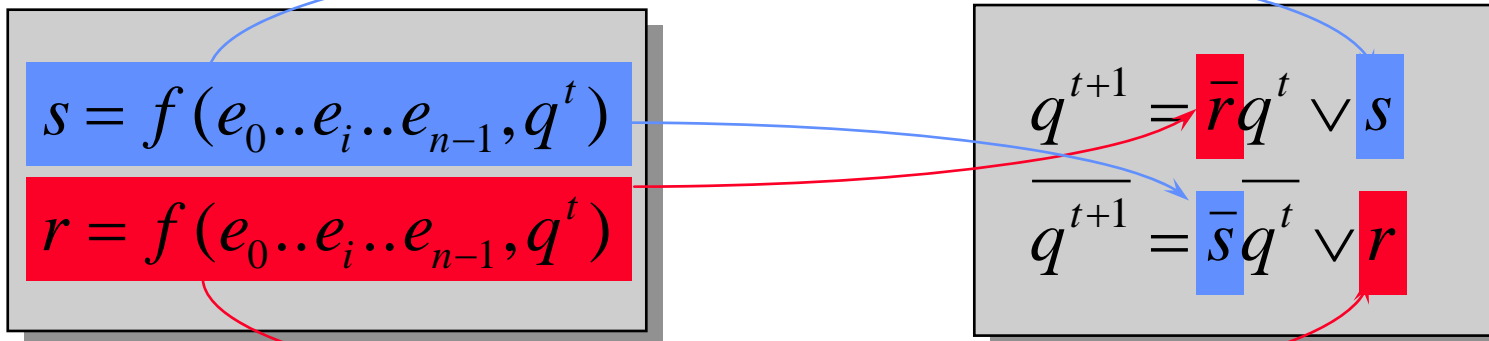
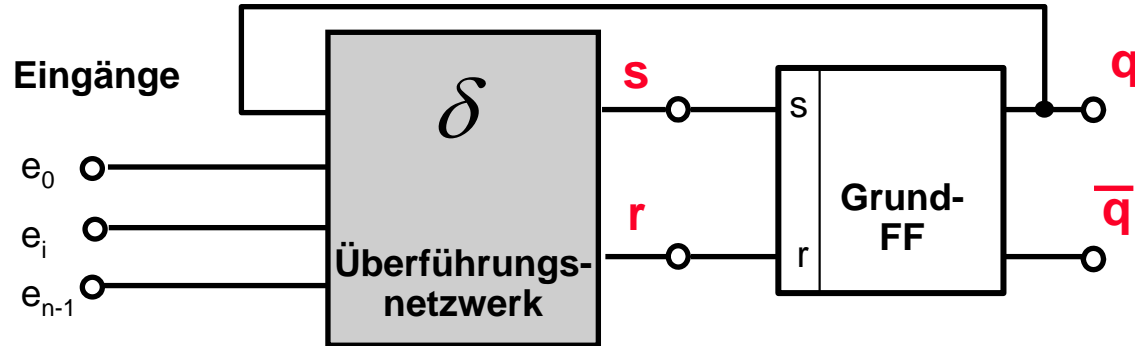
Vollständiger Zustandsgraph



Unvollständiger Zustandsgraph

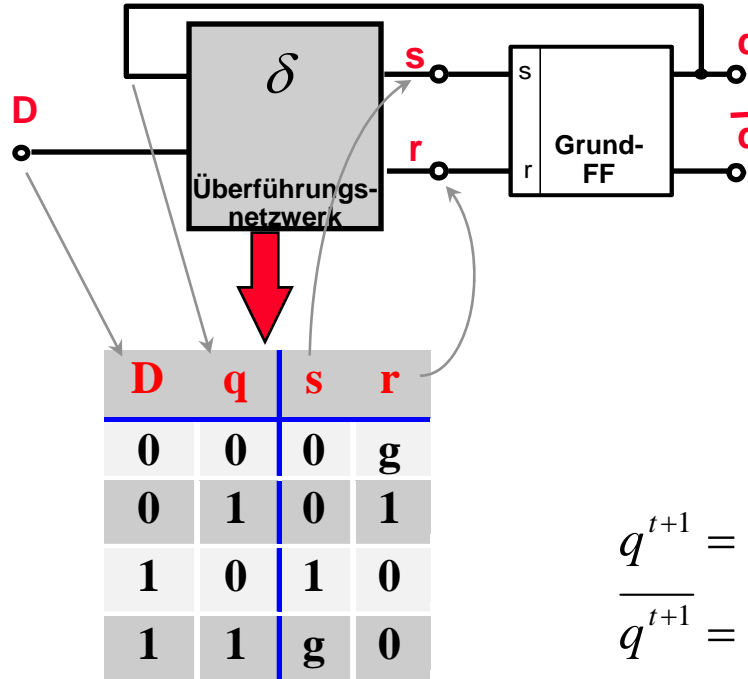
q^t	q^{t+1}	s	r
0	→ 0	0	g
0	→ 1	1	0
1	→ 0	0	1
1	→ 1	g	0

Zustandsübergangstabelle



Das D-Flip-flop übernimmt den Zustand auf D an den Ausgang q.

D	q ^{t+1}
0	0
1	1



Ansteuerfunktion

$$s = D$$

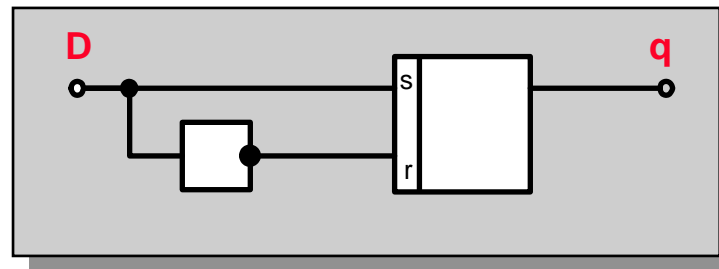
$$r = \overline{D}$$

$$q^{t+1} = \overline{\overline{D}q^t} \vee D = D$$

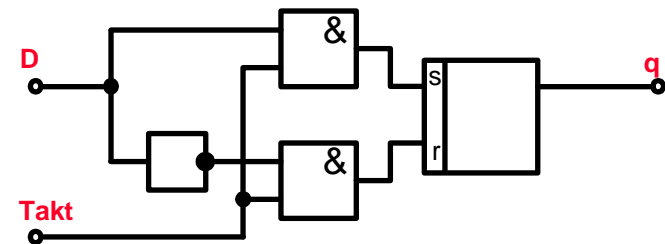
$$\overline{q^{t+1}} = \overline{\overline{D}q^t} \vee \overline{D} = \overline{D}$$

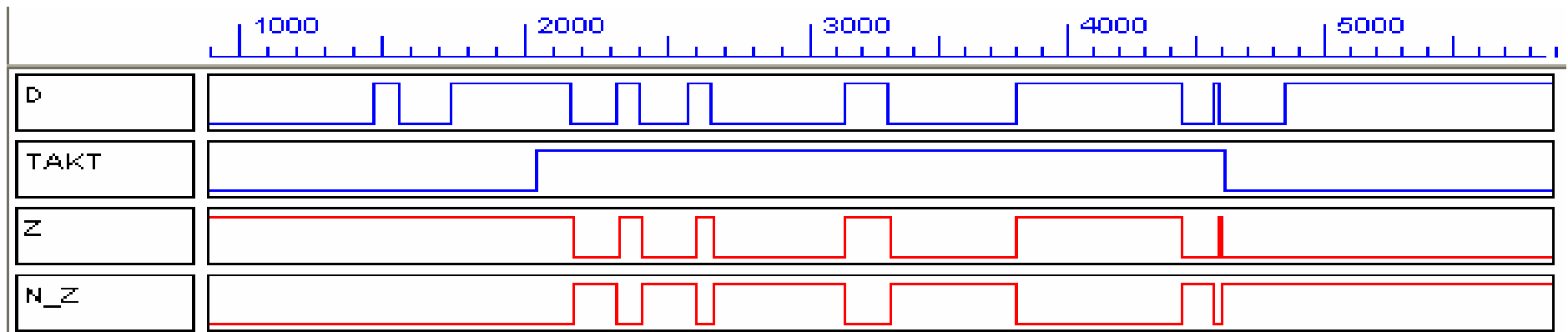
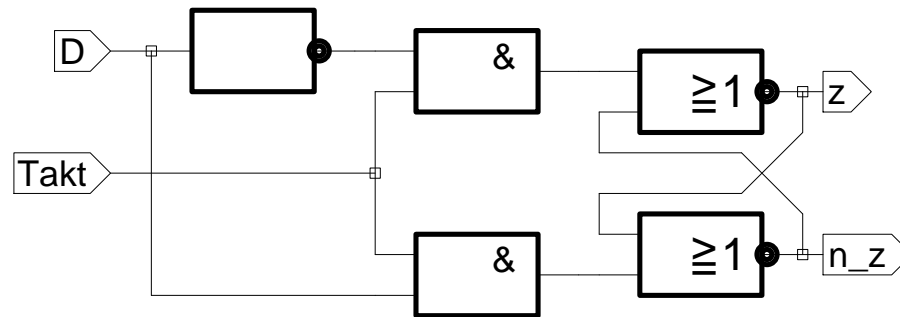
q ^t	q ^{t+1}	s	r
0	→ 0	0	g
0	→ 1	1	0
1	→ 0	0	1
1	→ 1	g	0

Zustandsübergangstabelle des Grund-Flip-Flop

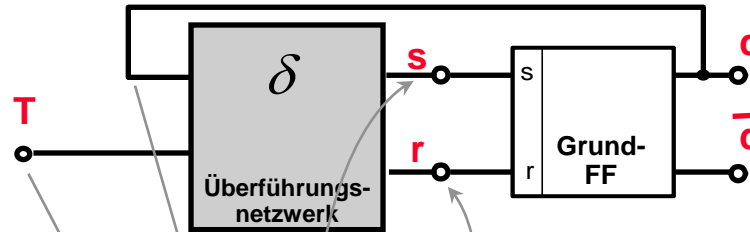


Charakteristische Gleichungen





Das T-Flip-flop ändert den Zustand auf q , wenn der Eingang $T = 1$ ist.



T	q^{t+1}
0	q^t
1	$\overline{q^t}$

T	q	s	r
0	0	g	g
0	1	g	0
1	0	1	0
1	1	0	1

$$s = T\overline{q}$$

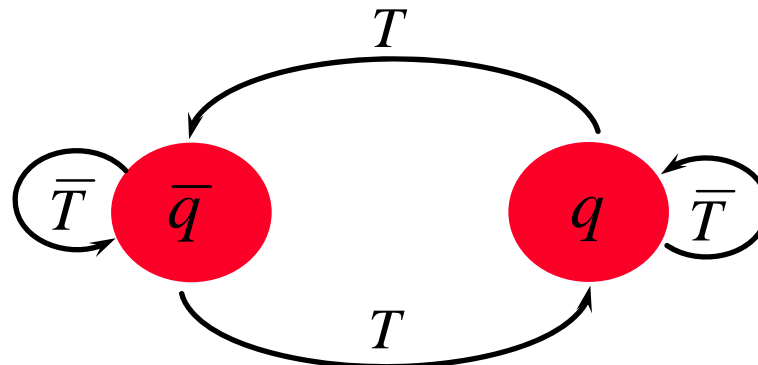
$$r = Tq$$

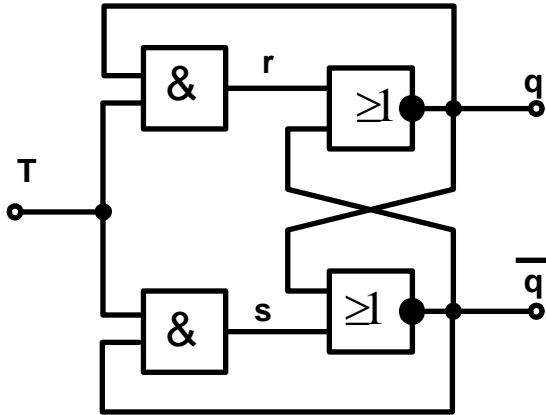
Ansteuerfunktion

$$q^{t+1} = \overline{T}q^t \vee T\overline{q^t}$$

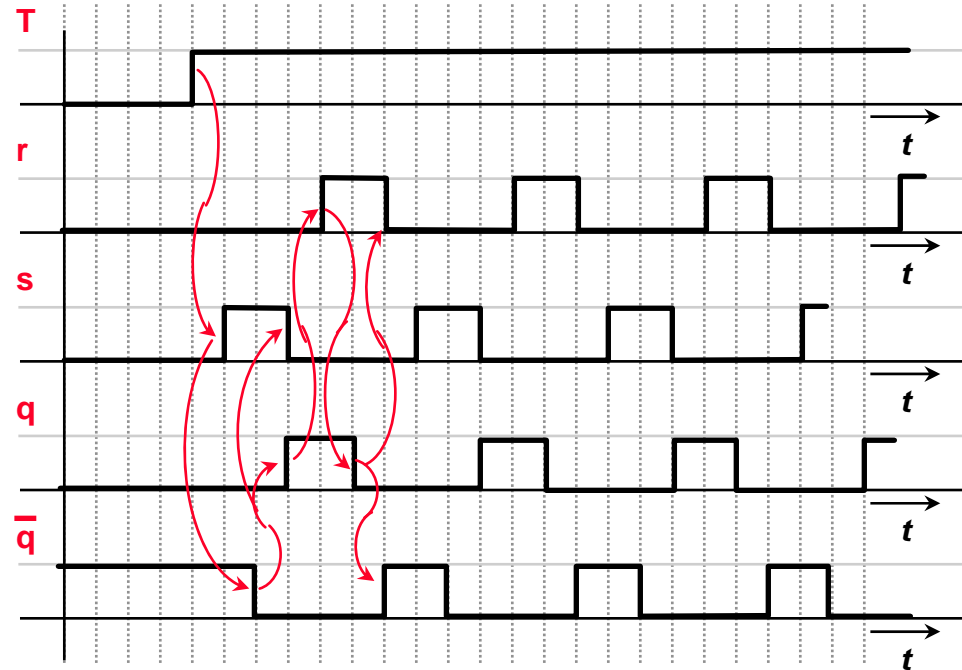
$$\overline{q^{t+1}} = \overline{T}\overline{q^t} \vee Tq^t$$

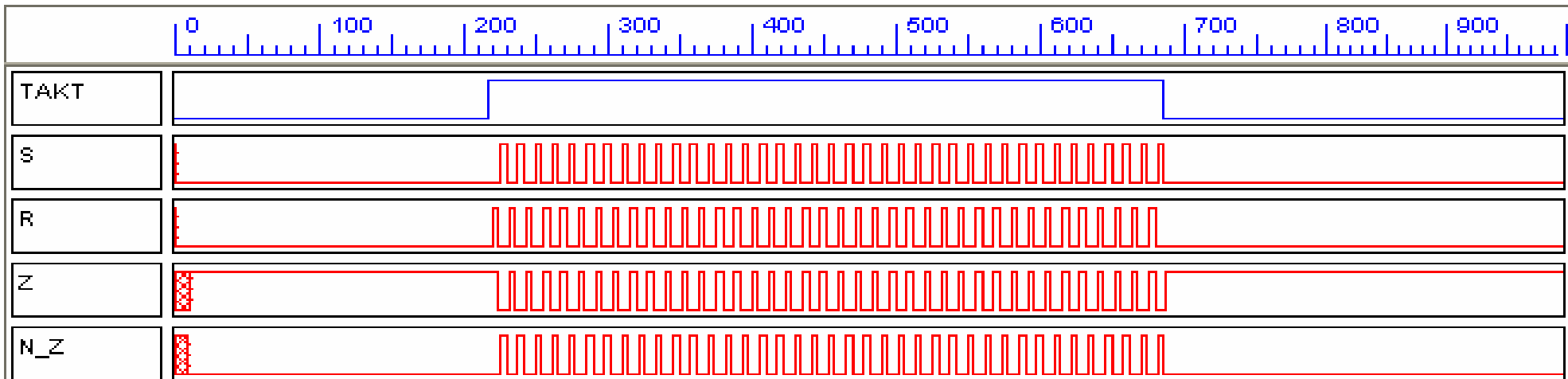
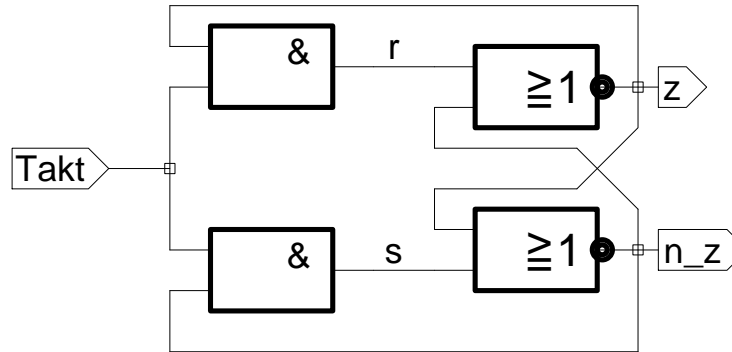
Charakteristische Gleichungen

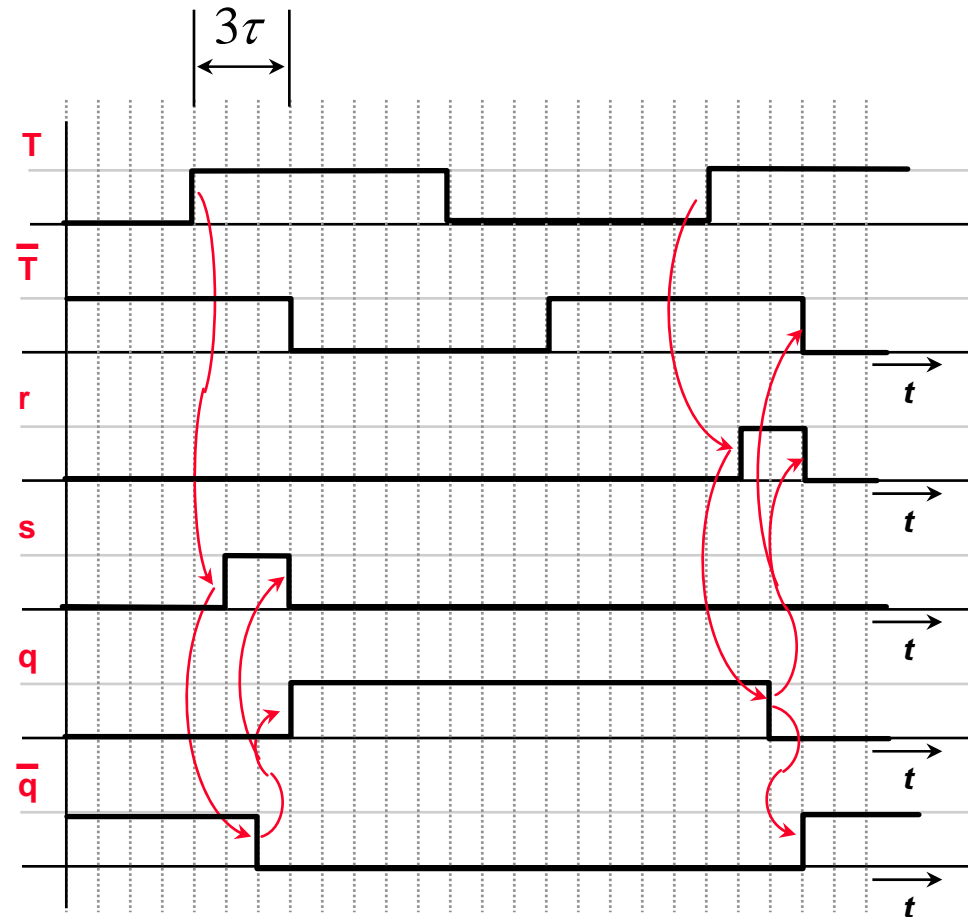
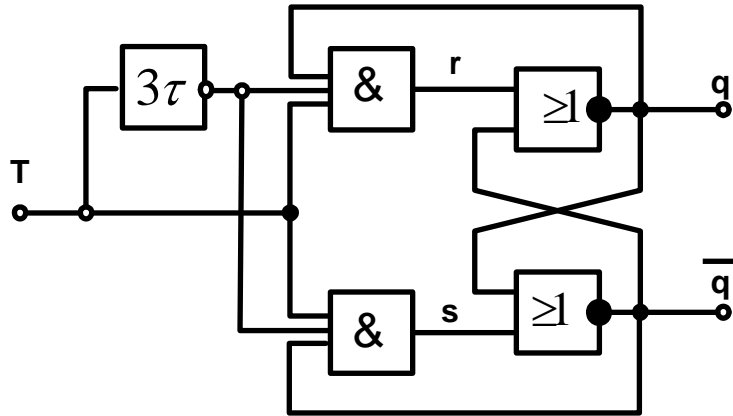




Achtung !
Ein aus Standardgattern
zusammengesetztes
T- FF schwingt.







Flankengetriggertes T-FF

Aus Standardgattern zusammengesetzt.

