

Reguläre Sprachen

3 Darstell.: $L = \{ab^n \mid n \in \mathbb{N}_0\}$

- Automat: $\rightarrow (s_0) \xrightarrow{a} (s_1) \xrightarrow{b} (s_1)$

- reg. Ausdruck: ab^*

- Grammatik: $S \rightarrow aB$
 $B \rightarrow bB \mid \varepsilon$

($S \Rightarrow aB \Rightarrow abB \Rightarrow abbB \Rightarrow abbbB \Rightarrow abbbbB \Rightarrow \dots$)

$$\alpha? = (\alpha/\varepsilon)$$

$L = \{a^n b^n \mid n \in \mathbb{N}_0\}$
 nicht regulär

$S \rightarrow aSb \mid \varepsilon$

$L = \{a^n b^n c^n \mid n \in \mathbb{N}_0\}$
 ganz problematisch

$aSb \rightarrow bTa$

6.1 - $a? : [a/\varepsilon] : (a/\varepsilon)$

- $abc(def)?ghi$

$[a \cdot [b \cdot [c \cdot [\varepsilon / [d \cdot [e \cdot \dots$

$abc(def|\varepsilon)ghi$

- $abc(def)^*ghi$

$\dots [[d \cdot [e \cdot [f]]] \otimes$

$\dots (def)^*$

- . (Punkt)

$[a|[b|[c| \dots]]]$, alle $x \in \Sigma$

$(a|b|c| \dots)$

- α^+
 $[[\alpha] \otimes \alpha]$

$\alpha^* \alpha \equiv \alpha \alpha^*$

- $[a-d][o-g]+[a-d]$

$[[a|[b|[c|[d]]]] \cdot$

$[[NbN \cdot [NbN] \otimes] \cdot$

$[[a|[b \dots d]]]]]$

$(a|b|d)(o|p \dots |g)$

$(a|b|d)(o|p \dots |g)^*(a|b|c|d)$

- $(ab)^*$
 $[[a \cdot b]] \otimes$

$(ab)^*$

6.2 $(\alpha/\alpha^*) \equiv \alpha^*$?

$L((\alpha/\alpha^*)) = L(\alpha^*)$

$L((\alpha/\alpha^*)) = L(\alpha) \cup L(\alpha^*)$

$= L(\alpha) \cup (L(\alpha))^*$

$(A^* = \bigcup_{n=0}^{\infty} A^n, A^n = A \cdot A^{n-1})$

$= L(\alpha) \cup \bigcup_{n=0}^{\infty} (L(\alpha))^n$

$(\bigcup_{n=0}^{\infty} X_n = X_0 \cup X_1 \cup X_2 \dots)$

$= L(\alpha^*)$

$(\varepsilon/\alpha^*) \equiv \alpha^*$?

nur klären: $L(\varepsilon) \subseteq L(\alpha^*)$?

$L(\varepsilon) = \{\varepsilon\} = L(\alpha^0)$

$\subseteq L(\alpha^*)$ ✓

$(\alpha/\beta)^* \equiv (\alpha^*/\beta^*)$?

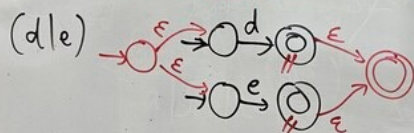
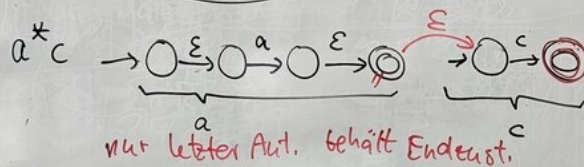
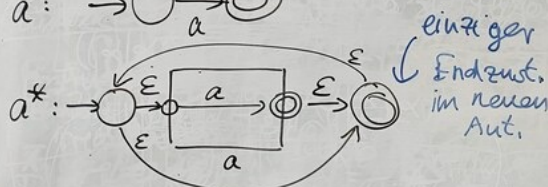
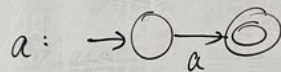
Bsp.: $\alpha = a, \beta = b$

$ab \in L((a/b)^*)$

$ab \notin L(a^*/b^*)$

$= L(a^*) \cup L(b^*)$

6.3 | $a^*c(d|e)^*$



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6.4 | $S \rightarrow aB$
 $B \rightarrow bB | c$

Bsp.: $ac: S \Rightarrow aB \Rightarrow ac$

$abbc: S \Rightarrow aB \Rightarrow a b B \Rightarrow a b b B \Rightarrow a b b c$

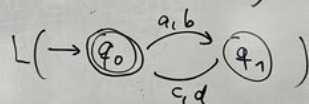
6.5 | $S \rightarrow Cd$
 $C \rightarrow Cc | Bb | a$
 $B \rightarrow Bb | a$

6.6 | a) $S \rightarrow (aab|bba)T$
(informell)

$$L(G_1) = L((aab|bba)(cc)^*)$$

$$= \{ w_1 w_2 \mid w_1 \in \{ aab, bba \}, w_2 = c^{2n}, n \in \mathbb{N}_0 \}$$

b) $((a|b)(c|d))^*$



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6.5 | $S \rightarrow Cd$
 $C \rightarrow Cc | Bb | a$
 $B \rightarrow Bb | a$

Pump.Lemma $\{ a^n b^n \mid n \in \mathbb{N} \}$

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