04

1

2.

$L(A) = \{waa \mid w \in \{a, b\}^\star\}$

2

$F' = F$, da $\forall a \in \epsilon H(q_0).\, a \notin F$

$$
\begin{aligned}
\delta'(q_0, \epsilon) &= \{q_0, q_1, q_3\} \\
\delta'(q_0, a) &= \{q_0\}
\end{aligned}
$$

3

R^k_{ij}

$R^k_{ij} = R^{k-1}_{ik}(R^{k-1}_{kk})^\star R^{k-1}_{kj} \cup R^{k-1}_{ij}$

$r^0_{11} = \epsilon$
$r^0_{12} = a$
$r^0_{13} = b$

$r^0_{21} = b$
$r^0_{22} = \epsilon$
$r^0_{23} = a$

$r^0_{31} = \emptyset$
$r^0_{32} = \emptyset$
$r^0_{33} = a + b + \epsilon$

$k = 3, i = 1, j = 3$

$$
\begin{aligned}
r^3_{13} &= r^2_{13}(r^2_{33})^\star r^2_{33} + r^2_{13} \\
&= (a(ba)^\star(bb + a) + b)(a + b + \epsilon)^\star(a + b + \epsilon) + (a(ba)^\star(bb + a) + b) \\
&\cong ((a(ba)^\star(bb + a)) + b)(a + b)^\star
\end{aligned}
$$

$k = 2$

$$
\begin{aligned}
r^2_{13} &= r^1_{12}(r^1_{22})^\star r^1_{23} + r^1_{13} &= a(ba + \epsilon)^\star(bb + a) + b &\cong a(ba)^\star(bb + a) + b \\
r^2_{33} &= r^1_{32}(r^1_{22})^\star r^1_{23} + r^1_{33} &= \emptyset(ba + \epsilon)^\star(bb + a) + (a + b + \epsilon) &\cong a + b + \epsilon
\end{aligned}
$$

$$
\begin{aligned}
r_{12}^1 &= r_{11}^0(r_{11}^0)^\star r_{12}^0 + r_{12}^0 &=& \quad \epsilon(\epsilon)^\star a + a &\cong& \quad a \\
r_{22}^1 &= r_{21}^0(r_{11}^0)^\star r_{12}^0 + r_{22}^0 &=& \quad b(\epsilon)^\star a + \epsilon &\cong& \quad ba + \epsilon \\
r_{23}^1 &= r_{21}^0(r_{11}^0)^\star r_{13}^0 + r_{23}^0 &=& \quad b(\epsilon)^\star b + a &\cong& \quad bb + a \\
r_{13}^1 &= r_{11}^0(r_{11}^0)^\star r_{13}^0 + r_{13}^0 &=& \quad \epsilon(\epsilon)^\star b + b &\cong& \quad b \\
r_{32}^1 &= r_{31}^0(r_{11}^0)^\star r_{12}^0 + r_{32}^0 &=& \quad \emptyset(\epsilon)^\star a + \emptyset &\cong& \quad \emptyset \\
r_{33}^1 &= r_{31}^0(r_{11}^0)^\star r_{13}^0 + r_{33}^0 &=& \quad \emptyset(\epsilon)^\star b + (a+b+\epsilon) &\cong& \quad a + b + \epsilon
\end{aligned}
$$

Zustandseliminierung

$$(ab)^* (aa + b)(a + b)^*$$