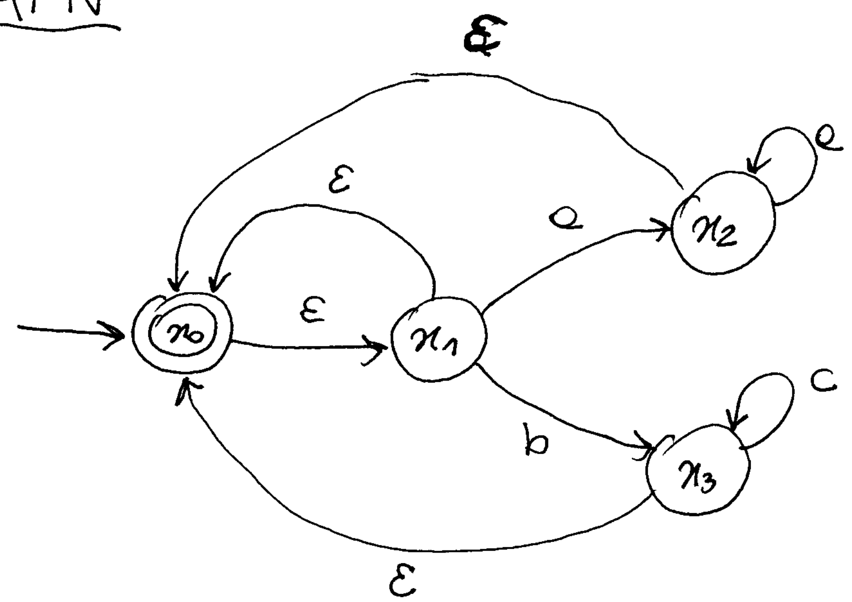
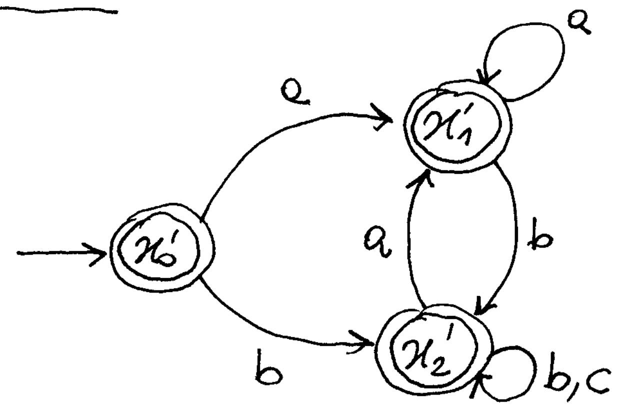
$$\alpha = (a^* + bc^*)^* + bc^*a$$
$$= (a^* + bc^*)^*$$

AFN



AFD



$x'_0 = \{x_0, x_1\}$

$x'_1 = \{x_0, x_1, x_2\}$

$x'_2 = \{x_0, x_1, x_3\}$.

⋮

$\mathcal{X}' = \{x'_0, x'_1\}$, $\mathcal{X}'_{new} = \{x'_2\}$.

evento a

$A(x'_2, a) = \{x_2\}$, $B(x'_2, a) = \{x_0, x_1, x_2\} = x'_1$

evento b

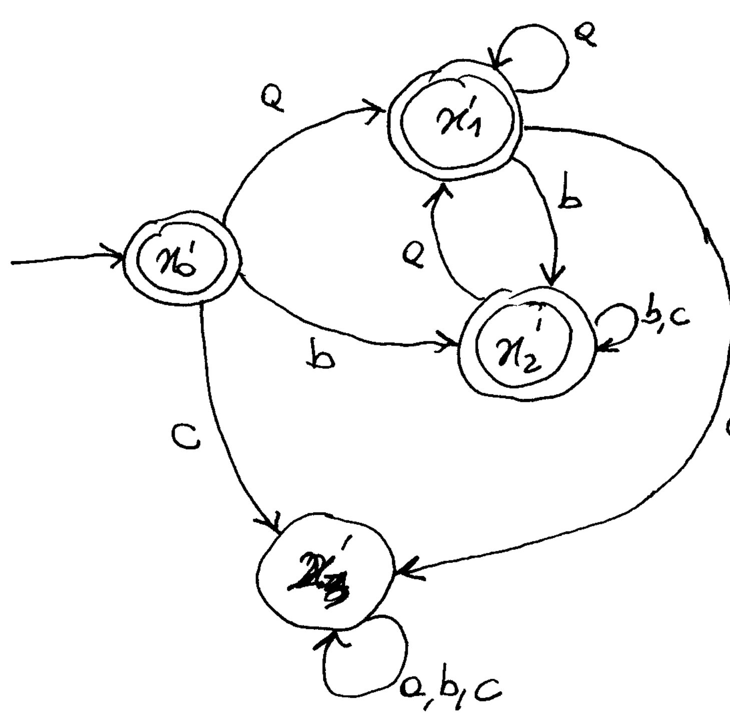
$A(x_2', b) = \{x_3\}$, $B(x_2', b) = \{x_0, x_1, x_3\} = x_2'$

evento c

$A(x_2', c) = \{x_3\}$, $B(x_2', c) = \{x_0, x_1, x_3\} = x_2'$

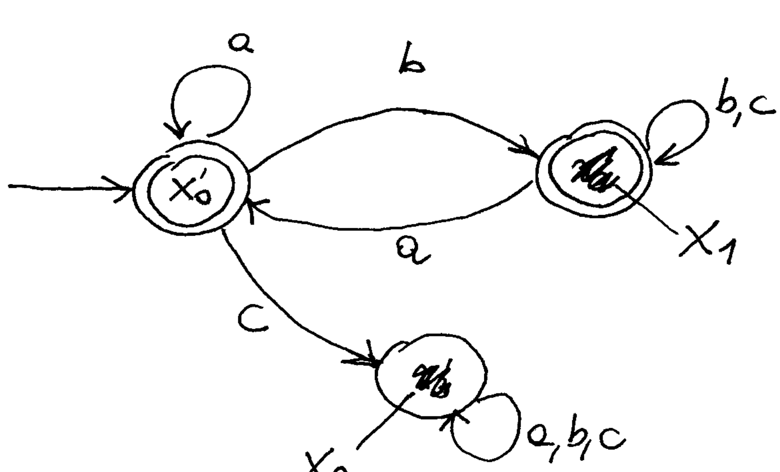
$X' = \{x_0', x_1', x_2'\}$, $X'_{new} = \emptyset$

STATI FINALI: $F' = \{x_0', x_1', x_2'\}$



⇒ è minimo?

Gli stati x_0' e x_1' sono equivalenti per la regola R.2.



$$\begin{cases} \alpha_0 = \varepsilon + \alpha_0 a + \alpha_1 a \\ \alpha_1 = \alpha_0 b + \alpha_1 (b+c) \end{cases}$$

...

$$\boxed{\alpha = \alpha_0 + \alpha_1}$$

$$\alpha_0 = \varepsilon + (\alpha_0 + \alpha_1) a = \varepsilon + \alpha a$$

$$\underbrace{\alpha_1 = (\alpha_0 + \alpha_1) b + \alpha_1 c = \alpha b + \alpha_1 c}$$

$$\boxed{\begin{array}{l} \alpha = \beta + \alpha\gamma \\ \alpha = \beta\gamma^* \end{array}}$$

$$\Downarrow$$

$$\alpha_1 = \alpha b c^*$$

$$\alpha = \alpha_0 + \alpha_1 = \underbrace{\varepsilon + \alpha a}_{\alpha_0} + \underbrace{\alpha b c^*}_{\alpha_1} = \varepsilon + \alpha (a + bc^*)$$

$$\Downarrow$$

$$\boxed{\alpha = (a + bc^*)^*}$$

ESERCIZIO

AFD equivalente a $\alpha = (a+b)^*c + \underbrace{b(b+c)a}_{\substack{bba \\ bca}}$

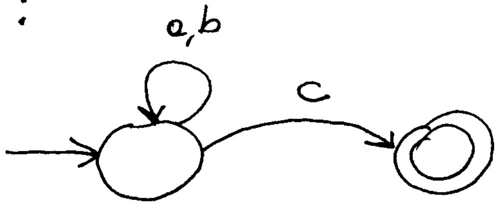
1° metodo

$\alpha_1 = (a+b)^*c$

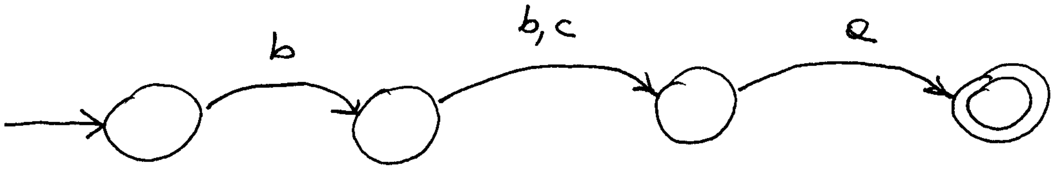
$\alpha_2 = b(b+c)a$

$\boxed{\alpha = \alpha_1 + \alpha_2}$

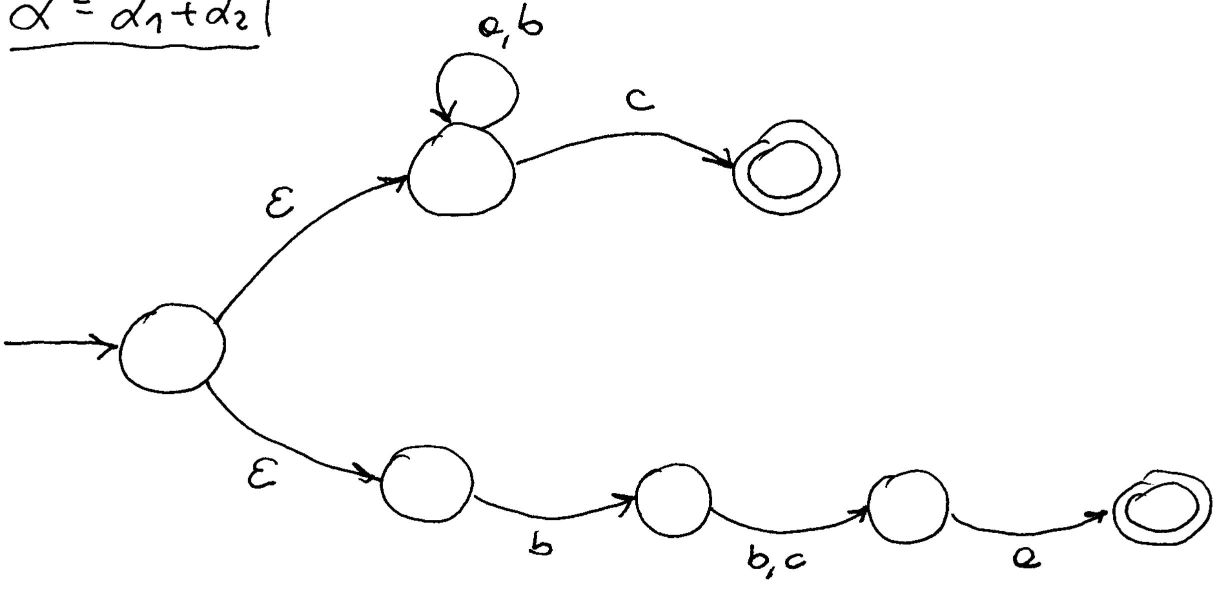
α_1:



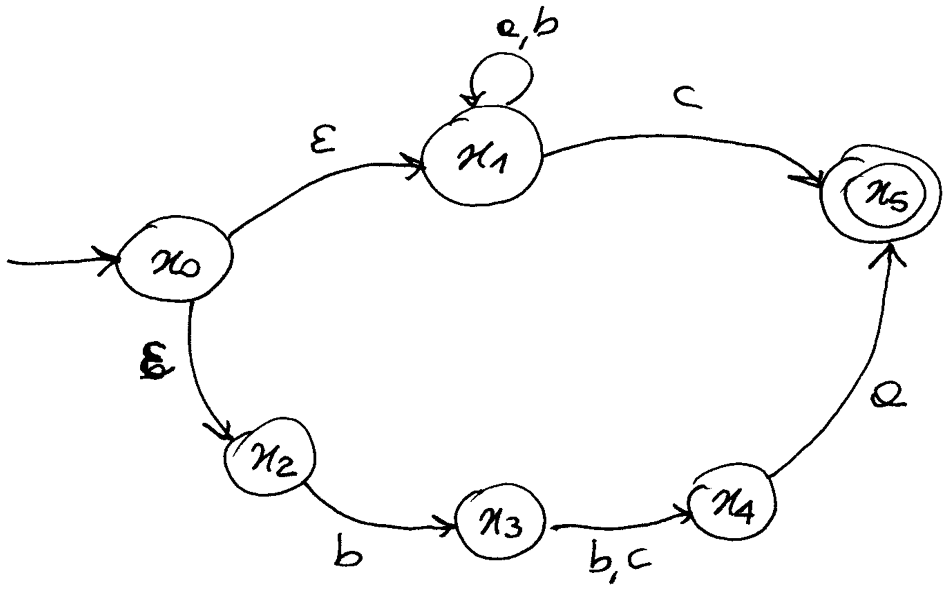
α_2:



$\boxed{\alpha = \alpha_1 + \alpha_2}$



I due stati finali sono equivalenti (regola R.2)



AFN

$D(x_0) = \{x_0, x_1, x_2\}$ $\quad D(x_3) = \{x_3\}$

$D(x_1) = \{x_1\}$ $\quad D(x_4) = \{x_4\}$

$D(x_2) = \{x_2\}$ $\quad D(x_5) = \{x_5\}$.

$D_a(x_0) = \emptyset$ $\quad D_a(x_1) = \{x_1\}$ $\quad D_a(x_2) = \emptyset$ $\quad D_a(x_3) = \emptyset$

$D_b(x_0) = \emptyset$ $\quad D_b(x_1) = \{x_1\}$ $\quad D_b(x_2) = \{x_3\}$ $\quad D_b(x_3) = \{x_4\}$

$D_c(x_0) = \emptyset$ $\quad D_c(x_1) = \{x_5\}$ $\quad D_c(x_2) = \emptyset$ $\quad D_c(x_3) = \{x_4\}$

$D_a(x_4) = \{x_5\}$ $\quad D_a(x_5) = \emptyset$

$D_b(x_4) = \emptyset$ $\quad D_b(x_5) = \emptyset$

$D_c(x_4) = \emptyset$ $\quad D_c(x_5) = \emptyset$

- $x_0' = D(x_0) = \{x_0, x_1, x_2\}$

- $X' = \emptyset$, $X'_{new} = \{x_0'\}$

Analizziamo x_0'.

evento a

$$A(x_0', a) = D_a(x_0) \cup D_a(x_1) \cup D_a(x_2) = \{x_1\}$$

$$B(x_0', a) = D(x_1) = \{x_1\}$$

$$\Rightarrow x_1' = \{x_1\}.$$

~~evento~~ $X'_{new} = \{x_0', x_1'\}.$

evento b

$$A(x_0', b) = D_b(x_0) \cup D_b(x_1) \cup D_b(x_2) = \{x_1, x_3\}$$

$$B(x_0', b) = D(x_1) \cup D(x_3) = \{x_1, x_3\}$$

$$\Rightarrow x_2' = \{x_1, x_3\}$$

$$X'_{new} = \{x_0', x_1', x_2'\}.$$

evento c

$$A(x_0', c) = D_c(x_0) \cup D_c(x_1) \cup D_c(x_2) = \{x_5\}$$

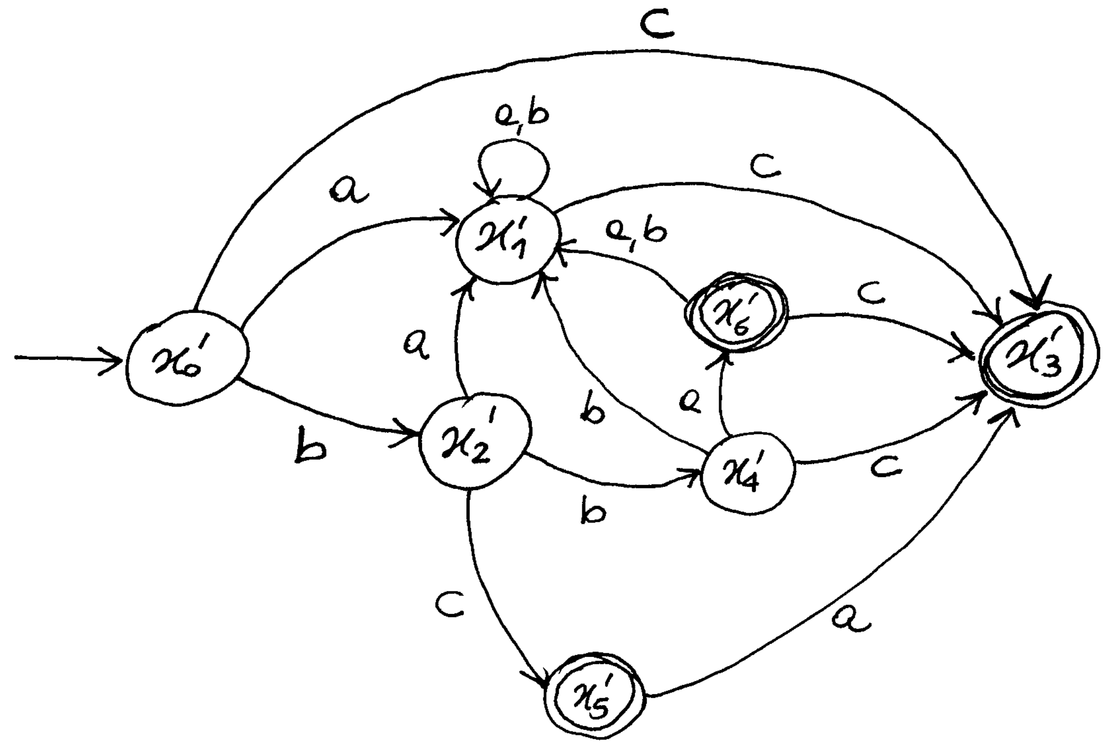
$$B(x_0', c) = D(x_5) = \{x_5\}$$

$$\Rightarrow x_3' = \{x_5\}$$

$$X'_{new} = \{x_0', x_1', x_2', x_3'\}$$

$$X' = \{x_0'\}, \quad X'_{new} = \{x_1', x_2', x_3'\}$$

- - - - -



$x_0' = \{x_0, x_1, x_2\}$ $\qquad$ $x_4' = \{x_1, x_4\}$

$x_1' = \{x_1\}$ $\qquad$ $x_5' = \{x_4, x_5\}$

$x_2' = \{x_1, x_3\}$ $\qquad$ $x_6' = \{x_1, x_5\}$

$x_3' = \{x_5\}$

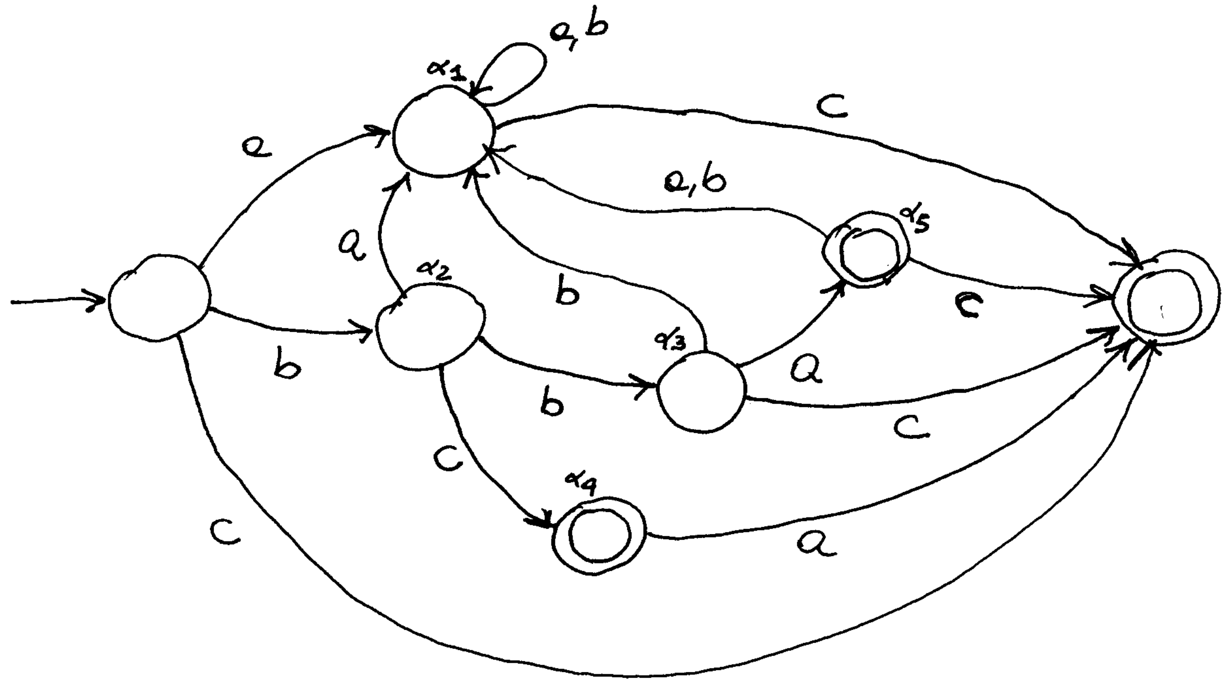
2° metodo

$$\alpha = (a+b)^* c + b(b+c)a$$

$$= c + (a+b)(a+b)^* c + b(b+c)a$$

$$= a\underbrace{(a+b)^* c}_{\alpha_1} + b\underbrace{\left((a+b)^* c + (b+c)a\right)}_{\alpha_2} + c$$

$$\boxed{\gamma^* = \varepsilon + \gamma\gamma^*}$$



$$\alpha_1 = (a+b)^* c$$

$$\alpha_2 = (a+b)^* c + (b+c)a$$

$$= c + (a+b)(a+b)^* c + (b+c)a$$

$$= a \underbrace{(a+b)^* c}_{\alpha_1} + b \underbrace{\left((a+b)^* c + a\right)}_{\alpha_3} + c \underbrace{(\varepsilon + a)}_{\alpha_4}$$

$$\alpha_3 = (a+b)^* c + a$$

$$= c + (a+b)(a+b)^* c + a$$

$$= a \underbrace{\left(\varepsilon + (a+b)^* c\right)}_{\alpha_5} + b \underbrace{(a+b)^* c}_{\alpha_1} + c$$

$$\alpha_4 = \varepsilon + a$$

$$\alpha_5 = \varepsilon + (a+b)^* c = \varepsilon + c + (a+b)(a+b)^* c$$

$$= \varepsilon + a \underbrace{(a+b)^* c}_{\alpha_1} + b \underbrace{(a+b)^* c}_{\alpha_1} + c$$