EQUIVALENCIA ENTRE AFN Y AFD

TEOREMA. *Sea L un conjunto o lenguaje aceptado por un AFN, entonces existe un AFD que acepta a L.*

Sea $M=(Q,\ \Sigma,\ \delta,\ q_0,\ F)$ *un AFN que acepta a L. Se define un AFD* $M' = (Q',\ \Sigma,\ \delta',\ q_0',\ F')$ *como sigue* :

$Q' = 2^Q$ $\boxed{\left(2^A = \{B \mid B \subseteq A\}\right)}$ $\boxed{\rightarrow\ 2^n \text{ elementos, } n \text{ es la cantidad de elementos del conjunto } A}$

F' = *El conjunto de estados de* Q' *que contienen a algun elemento de* F.

Los elementos de Q' *se denotan por* :

$$[q_1,\ q_2,\ \ldots,\ q_i] \text{ con } q_1,\ q_2,\ \ldots,\ q_i\ \in\ Q$$

$q_0' = [q_0]$

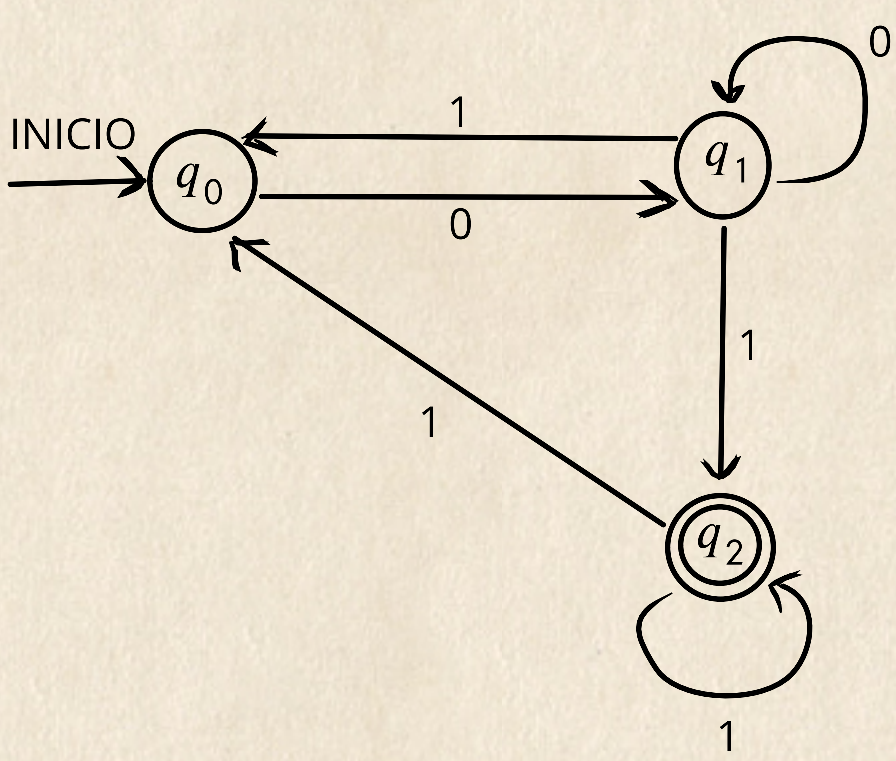
$\delta'([q_1,\ q_2,\ldots,\ q_i],\ a) = [p_1,\ p_2,\ \ldots,\ p_j]$ *si y solo si* $\delta(\{q_1,\ q_2,\ \ldots,\ q_i\},\ a) = \{p_1,\ p_2,\ \ldots,\ p_j\}$

$\delta'(q_0',\ x) \in F'$ *cuando* $\delta(q_0,\ x) \cap F \neq \varnothing$

EJEMPLO:

A PARTIR DEL AFN PROPUESTO QUE ACEPTA A L(M), CONSTRUIR UN AFD QUE ACEPTE TAMBIEN A L(M).

$M=(Q,\ \Sigma,\ \delta,\ q_0,\ F)$



	ENTRADAS		
ESTADO	0	1	
q_0	$\{q_1\}$	$\varnothing$	0
q_1	$\{q_1\}$	$\{q_0,q_2\}$	0
q_2	$\varnothing$	$\{q_0,q_2\}$	1

$Q=\{q_0,\ q_1,\ q_2\}$

$\Sigma = \{0,1\}$

$F=\{q_2\}$

$M' = (Q',\ \Sigma,\ \delta',\ q_0',\ F')$

$Q' = 2^Q = ([\varepsilon],[q_0],\ [q_1],\ [q_2],\ [q_0,q_1],[q_0,q_2],[q_1,q_2],\ [q_0,q_1,q_2])$

Para crear δ' :

$\delta(\{q_0\},\ 0) = \{q_1\}$ ✓ $\longrightarrow$ $\delta'([q_0],0) = [q_1]$

$\delta(\{q_0\},\ 1) = \varnothing$ ✓ $\longrightarrow$ $\delta'([q_0],1) = [\varepsilon]$

$\delta(\{q_1\},0) = \{q_1\}$ ✓ $\longrightarrow$ $\delta'([q_1],\ 0) = [q_1]$

$\delta(\{q_1\},1) = \{q_0,\ q_2\}$ ✓ $\longrightarrow$ $\delta'([q_1],\ 1) = [q_0,\ q_2]$ ✓

$\delta(\varnothing,0) = \varnothing$ ✓ $\longrightarrow$ $\delta'([\varepsilon],0) = [\varepsilon]$

$\delta(\varnothing,1) = \varnothing$ ✓ $\longrightarrow$ $\delta'([\varepsilon],1) = [\varepsilon]$

$\delta(\{q_0,q_2\},0) = \delta(\{q_0\},0) \cup \delta(\{q_2\},0) = \{q_1\} \cup \varnothing = \{q_1\}$ ✓ $\longrightarrow$ $\delta'([q_0,q_2],0) = [q_1]$

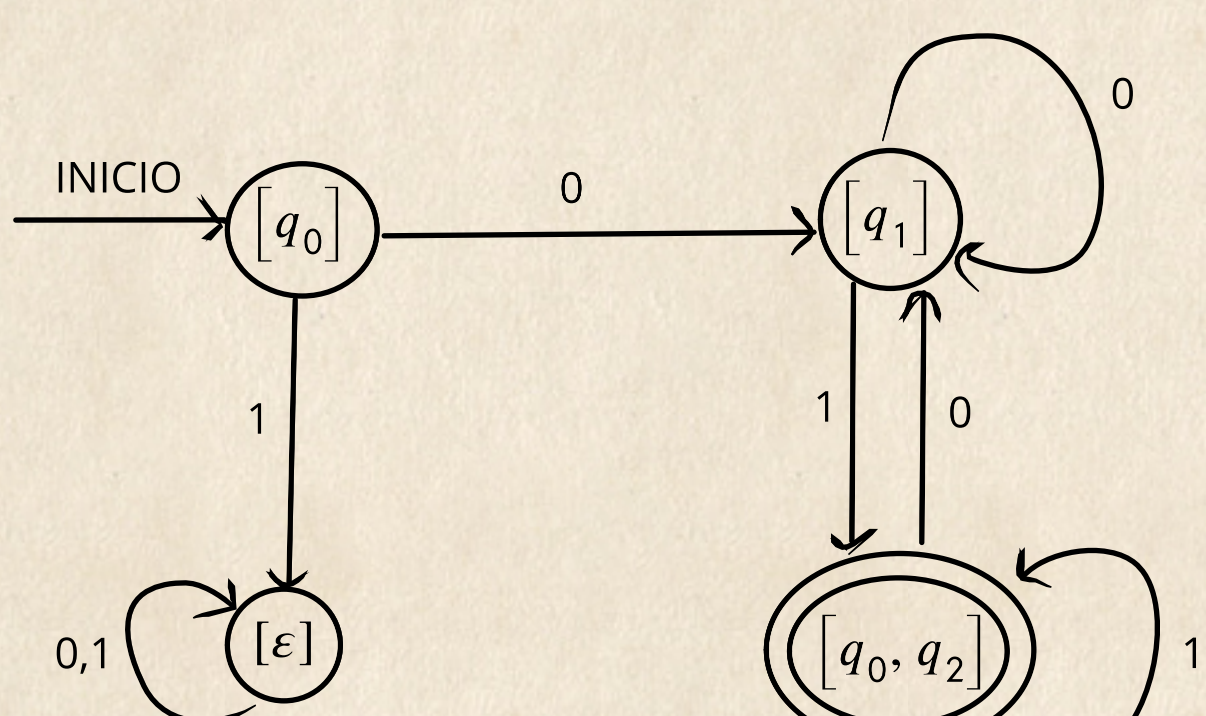
$\delta(\{q_0,q_2\},1) = \delta(\{q_0\},1) \cup \delta(\{q_2\},1) = \varnothing \cup \{q_0,\ q_2\} = \{q_0,\ q_2\}$ ✓ $\longrightarrow$ $\delta'([q_0,\ q_2],1) = [q_0,q_2]$ ✓

Para crear el estado inicial :

$q_0' = [q_0]$

Para crear F' :

$F' = \{[q_0,\ q_2]\}$



$\boxed{011101}$ ✓

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