Example: Extended Transition Function

$\delta(q, a)$ is known. $\delta: Q \times X \to Q$

Want to define $\tilde{\delta}: Q \times X^* \to Q$

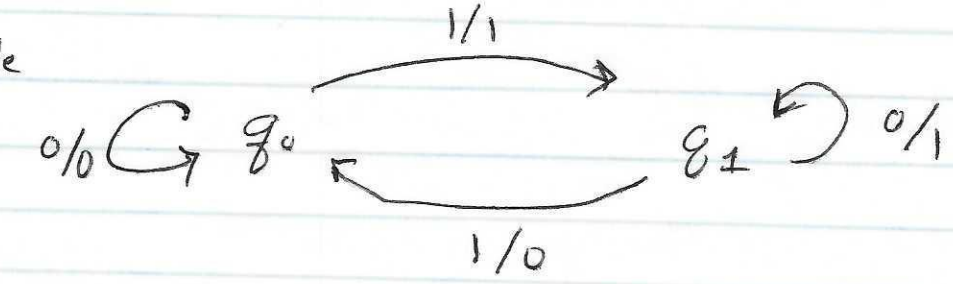
Definition:

$\tilde{\delta}(q, a) = \delta(q, a)$ for $a \in X$.

$\tilde{\delta}(q, xa) = \delta(\tilde{\delta}(x), a)$ for $x \in X^+$, $a \in X$

$\tilde{\delta}(q, \lambda) = q$

Example



What does $\tilde{\delta}(q_1, 101)$ mean

$\tilde{\delta}(q_1, 101) = \delta(\tilde{\delta}(q_1, 10), 1)$

?

$\tilde{\delta}(q_1, 10) = \delta(\tilde{\delta}(q_1, 1), 0)$

?

$\tilde{\delta}(q_1, 1) = q_0 = \delta(q_1, 1)$.

$\tilde{\delta}(q_1, 10) = \delta(q_0, 0) = q_0$

$\tilde{\delta}(q_1, 101) = \delta(q_0, 1) = q_1$