

Question 1.31

for any string $w = w_1 \dots w_n$, the reverse $w = w^R$ is the string in reverse order. For any language A , let $A^R = \{w^R \mid w \in A\}$. Show if A is regular, so is A^R .

Let $M = (Q, \Sigma, \delta, s, F)$ be a NFA that takes in L .

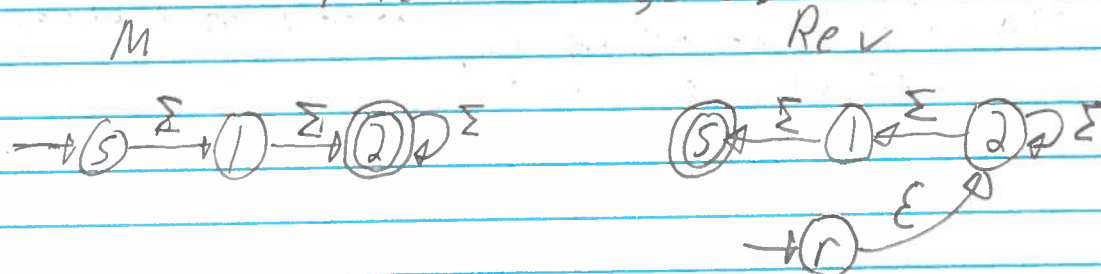
if I create another NFA that w^R can traverse into the starting state.

So NFA $Rev = (Q \cup \{r\}, \Sigma, \gamma, r, \{s\})$

where γ is a reversed transitions $(q, a) \rightarrow q'$ is now $(q', a) \rightarrow q$ in addition there are ϵ transitions from r to all of the accept states, F .

There now exists a sequence of transitions in M from s to F where the input is w if and only if there exists a sequence of ϵ in Rev from r to s when input is w^R .

There fore Regular.



Example of M and Rev