Probs 1: Let $L$ be a regular language

Then the language $L_1 = \{ a_1a_3a_5\ldots a_{2n-1} \mid q, q_2q_3\ldots q_{2n} \in L \}$

is regular / not regular.

Suppose $\Sigma = \{0, 1\}$ and say $L$ consists of the string

$L = \{ 11010011, 1101010010000, x_0x_1x_2x_3x_4x_5 \}

L_1 = \{ 1061, 100 \}, w_1, w_2, w_3, w_4, w_5, w_6$

Can we use Pl to prove that some language $L$ is regular?

If $L$ is regular $\Rightarrow ( )$

??
We have DFA $M$ to recognize $L$.

If $w_1w_2w_3 \ldots w_k \in L_1$, then there exists an $x, x_2, x_3 \ldots x_k \in \Sigma$ such that $w, x, w_2x_2, w_3x_3 \ldots w_kx_k \in L \iff \delta(q_0, w, x, w_2x_2, w_3x_3 \ldots w_kx_k) \in T$

For every state $q \in M$, say $q_0$.

For every shy $x$ accepted

new transition function

$\delta'(q, a) = \{ q' \mid p = \delta(q, ax), x \in \Sigma \}$
Claim 1: If \( \omega, \omega_1, \omega_2, \ldots, \omega_k \in L(M') \) then \( \exists x_1, x_2, \ldots, x_k \mid \omega, x_1, \omega_2, x_2, \ldots, \omega_k x_k \in \mathbb{N} \)

Claim 2: If \( \omega, x, \omega_2 x_2, \ldots, \omega_k x_k \in L(M) \) then \( \omega, \omega_2 \omega_3 \ldots \omega_k \in L(M') \)