$P = \{ L \mid L \in RE \wedge L = \{w\} \}$

arbitrary

L_P is in RE ?

Solution Consider $\overline{L_P} = \{ enc(M) \mid L(M) \notin P \}$

$= \{ enc(M) \mid L(M) \neq \{w\} \}$

$\overline{L_P}$ is in RE. To prove this it is sufficient to construct a TM M' s.t. $L(M') = \overline{L_P}$. Consider the following NON-DETERMINISTIC TM N (if $\exists$ NTM that recognize $\overline{L_P}$ then it would also exist some TM that recognize $\overline{L_P}$):