Relationships between models

Lemma

Let $t(n) > n$. Let L be a language decided by a multitape TM in time $t(n)$. Then there is a single tape TM that decides L in time $O((t(n))^2)$.

Proof idea:

East step of multitape machine can be executed on a single tape machine in time $O(t(n))$.

Lemma

Let $t(n) > n$. Let L be a language decided by a non-deterministic TM in time $t(n)$. Then there is a deterministic TM that decides L in time $2^{O(t(n))}$.

Proof idea: DIY