

We give a proof that there are incomparable Turing degrees.

Lemma 1. *$\neg\text{CH}$ implies the existence of incomparable Turing degrees.*

Proof. We know that there are only countably many Turing machines, so for every Turing degree \mathbf{d} , there are only countably many degrees $\mathbf{a} \leq \mathbf{d}$. Suppose that the Turing degrees are linearly ordered; then their cofinality is at most ω_1 , which now implies that there are \aleph_1 Turing degrees. We know that there are continuum many Turing degrees so if the degrees are linearly ordered then CH holds. \square

Now let \mathbb{P} be any notion of forcing such that $\Vdash_{\mathbb{P}} \neg\text{CH}$. Let ψ be the sentence which states that there are two incomparable Turing degrees. The lemma implies that $\Vdash_{\mathbb{P}} \psi$. However, stated in second order arithmetic we see that ψ is Σ_1^1 (as Turing reducibility is arithmetically definable). Thus ψ is absolute between models of set theory. It follows that ψ holds.