Homework 7

April 14, 2023

1 (40'). Prove that the collection of decidable languages is closed under

- union
- intersection
- concatenation

2 (30'). Let

$$L_{\text{eq}} = \{(M_1, M_2) : \text{Turing machine } M_1, M_2 \text{ accept the same language}\}.$$

Prove L_{eq} is undecidable.

2 (30'). Let

$$L_{\text{loop}} = \{(M, x) : \text{Turing machine } M \text{ loops forever on input } x\}.$$

Prove L_{loop} is undecidable.