

Rice's theorem:

Let P be a language. Given that:

- P is not trivial ($P \neq \emptyset, P \neq \Sigma^*$)
- P is only influenced by itself (for two turing machines that have the same language ($Z(M_1) = Z(M_2)$), then $M_1 \in P \Leftrightarrow M_2 \in P$)

Then, P is undecidable

$$\gamma = \exists x_2 \forall x_1 [R_1(x_1) \wedge R_2(x_1, x_1, x_2)]$$

$$\text{Model: } U = \{1\}, R_1 = \{1\}, R_2 = \{(1, 1, 1)\} \Leftrightarrow \eta = (U, R_1, R_2), \eta \models \gamma$$

$$Th(M) = \{\text{sentences } \gamma \mid m \models \gamma\} \quad \# \text{ theory of the model (from model theory)}$$

$$Mod(\gamma) = \{\text{models } m \mid m \models \gamma\}$$