an undeclared language

\[ H(i,j) \equiv M_i(j) \]

10. Recognizable (c.f. recursive enumerable)

\[ U(i,j) \leftrightarrow \text{Universal Turing machine} \]
Using \( f \), when \( A \in \text{ACAP} \), provides a proof of \( A \) in the set. The proof is the computation:

\[
\left\{ \rightarrow \middle\uparrow \; \text{reject} \; \right. \} \quad \text{proof} \ A \ \notin
\]
Diagonalization Argument

How many real numbers are there?

\[ \mathbb{R}, \quad \mathbb{C} \rightarrow \mathbb{N} \]

Infinite

\[ 0, 1, \frac{2}{3}, \frac{4}{5}, \ldots \]
\[ \mathbb{Z} \xrightarrow{\text{countable}} \mathbb{Q} \xrightarrow{\text{countable}} \mathbb{R} \xrightarrow{\text{uncountable}} \]
The set of \( \mathbb{N} \) is an infinite set.

\[ 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, \ldots \]

\[ \{ 3, 2, 3, 7, 6, 3 \} \]

Consider the set of the integers which are not prime.
$H(i, j)$

$\text{decidable}$

$P \text{ instance of problem }$ $\text{HALT}()$

$B$ $\text{HALT}()$
NP LT is undecidable
\[ L^*(M_e) \neq \emptyset \iff h(\cdot) = A \]
if \((A, i, j) = \epsilon\) \rightarrow \Sigma^* \text{ regular}

\[\text{FA} \rightarrow \text{QH not regular}\]

\[X \rightarrow = \text{FA} \]