inf.1 Introduction

The number of truth values of a matrix need not be finite. An obvious choice for a set of infinitely many truth values is the set of rational numbers between 0 and 1, \( V_\infty = [0, 1] \cap \mathbb{Q} \), i.e.,

\[
V_\infty = \left\{ \frac{n}{m} : n, m \in \mathbb{N} \text{ and } n \leq m \right\}.
\]

When considering this infinite truth value set, it is often useful to also consider the subsets

\[
V_m = \left\{ \frac{n}{m-1} : n \in \mathbb{N} \text{ and } n \leq m \right\}
\]

For instance, \( V_5 \) is the set with 5 evenly spaced truth values,

\[
V_5 = \{0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1\}.
\]

In logics based on these truth value sets, usually only 1 is designated, i.e., \( V^+ = \{1\} \). In other words, we let 1 play the role of (absolute) truth, 0 as absolute falsity, but formulas may take any intermediate value in \( V \).

One can also consider the set \( V_{[0,1]} = [0, 1] \) of all real numbers between 0 and 1, or other infinite subsets of \([0, 1]\), however. Logics with this truth value set are often called fuzzy.

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Bibliography